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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 6] [1920

# XXVI.—CONTRIBUTIONS TO THE FLORA OF MACEDONIA: III.*

W. B. Turrill.

The following additional contribution to our knowledge of the Macedonian flora is based chiefly on a collection of over 300 specimens made by Mr. L. V. Turner in 1917 and 1918. Nearly 120 species and varieties are here recorded for the first time in this series, and these appear in clarendon type in the systematic list below. Apart from these new records the chief interest of the collection lies in the fact that it was largely made in the eastern part of Macedonia in the neighbourhood of the Rendina Gulf. Very little, if any, botanical collecting had previously been done in this area and consequently considerable additions have been made to the known distribution of Macedonian plants.

The opportunity has been taken of recording some plants which for one reason or another were not included in the first and second contributions, and also of correcting a few errors which were made in the first paper.

Our greatest need at present, so far as the the Macedonian flora is concerned, are collections from the higher mountains, especially from those, such as the Belashika Planina, which probably have an Alpine flora in their highest parts. Help and advice will be most gladly given at Kew to anyone who is likely to have the opportunity of visiting these unexplored collecting grounds.

Mr. Turner has very kindly supplied the following account of the making of his collection:—

"We landed at Salonika early in February, 1917, and spent

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some little time at the Karaissi rest camp. The hills round are of crystalline rock, devoid of trees, and sparsely covered with coarse herbage and occasional low growing shrubs—such as the holly oak (*Quercus coccifera*). The occurrence of some tiny flowers, appearing just after the snow melted, aroused my interest and decided me to do what I could in making a collection.

"Apart from the very few collected at Karaissi the specimens were obtained chiefly while at four camps.

"The first of these was Lembet. Our camp was close to the village, on the edge of the Hortiach ridge, leading up to the peak Kotos, and just east of the Seres Road at Kilo. 5. The specimens were obtained during the months of March, April, May, and June from this neighbourhood, including the hilly country between Lembet and Jaladzik (Yellow-jack), and the Happy Valley, which runs approximately parallel to, and east of the Seres Road.

"Early in July we were encamped for some ten days at the great tumulus on the western side of the Seres Road at Kilo. 8½ and near the summit of the Derbend. A few specimens were added there, although I missed a fine white foxglove, many examples of which were in full flower on the pass going towards General's Corner.

"We then trekked along the Langaza-Beshik trough *via* the Rue Ignatia—through the Rendina Gorge with its magnificent vegetation to Stavros.

"My third set of specimens were obtained while at Stavros Point during the very hot months of July, August, and September. Here there is a narrow strip of alluvial land at the foot of the scrub-covered and wooded hills surrounding the Rendina (or Orfano) Gulf.

"Thence we trekked to the Struma front and a few additions were made to the collection during my encampments in the autumn of 1917 to May, 1918, near Ano Krusones. The latter lies almost at the summit (some 1200 ft. above sea level) of the sandy scrub-covered hills which are intersected by steep ravines and overlook the mouth of the Struma, Amphipolis Plateau, the Struma Gorge and Lake Ahinos. Superb and distant views of the Struma Plain and the Belashika Mountains could be obtained on almost any day, while the great peak of Pilav Tepe frowned or smiled on us continually, and away in the distance the graceful peak of Mount Athos rose from the sea on the south-eastern horizon.

"With greater freedom it is probable that a very large number of additional specimens could have been collected. One area of the hill side from Ano down the Brigade Track towards Tasli was covered with a fine bushy species of bell heather, of which I unfortunately obtained no specimen.

"Around here the flowers in the spring were as wonderful as they were reported to be on the great Struma Plain. In my own camp even varieties of fly, bee, and butterfly orchis, anemone, iris, and sweet violet abounded, while in the autumn crocus and cyclamen were equally abundant. Unfortunately during my

stay in this area opportunities for collecting and pressing specimens were few, so that many were omitted."

The two following papers dealing, the first in part, the second entirely, with the flora of Greek Macedonia, have recently appeared: A. G. Ogilvie, "A Contribution to the Geography of Macedonia," Geogr. Journ. Jan. 1920, p. 1. E. Jeanpert, "Enumeration de Plantes de Macedoine," Bull. Mus. Nat. d'Hist. Nat. Paris, 1919, Nos. 5 and 6, pp. 390, 517. Both deal with observations and collections made during the allied occupation, and the publication of the latter paper is not yet completed.

SYSTEMATIC LIST.

*Clematis Flammula*, L. Stavros, in flower and fruit, 8 and 9-17, *Turner*, 202, 233, 247, 259.

*Thalictrum angustifolium*, Jacq. Stavros, in flower and young fruit, 7-17, *Turner* 204, 205.

*Anemone stellata*, Lam. Lembet, in flower, 3-17, *Turner* 15; Ano, in flower, 4-17, *Turner* 313.

*Anemone blanda*, Schott et Kty. Lembet, in flower, 3-17, *Turner* 14.

**Adonis aestivalis,** *L.*

Struma Plain, 2 km. S.E. of Orljak, in flower and fruit, 23–4–17, *Turrill* 94.

*Distr.* Cent. and S. Eur., N. Afr., Orient.

Balkans: Greece, Maced., Bulg.

The following probably belong to this species, but the material is not sufficient to decide definitely: Struma Plain and Krusa Balkan, in flower 4 and 5-18, *Harris* 20, 225; Lembet, in flower and young fruit, 5-17, *Turner* 79.

**Ranunculus Ficaria,** *L.*

Ano, in flower, spring 1918, *Turner* 299.

*Distr.* Eur., Caucasus, Asia Minor, N. Afr.

Balkans: General.

This is very probably the var. *ficariaeformis*, Fiori (*Ficaria grandiflora*, Robert) but the material is insufficient to determine.

*Nigella arvensis*, L. Lembet, in flower, 6-17, *Turner* 173.

*Delphinium halteratum*, S. et S. 8½ km. N. of Salonika, in flower, 7-17, *Turner* 199.

**Delphinium peregrinum,** *L.*

Lembet, in flower, 7-17, *Turner* 186.

*Distr.* S.E. Eur., Orient.

Balkans: Greece, Maced.

*Delphinium paniculatum*, Host. Lembet, in flower, 6–17, *Turner* 142.

**Glaucium flavum,** *Cr.* (*G. luteum*, Scop.).

Stavros, in flower, 7-17, *Turner* 220.

*Distr.* Cent. and S. Eur., Canaries, Orient.

Balkans: Greece, Maced.

*Glaucium corniculatum*, Curt. var. *flaviflorum*, DC. 8½ km. N. of Salonika, in flower and fruit, 7-17, *Turner* 198.

**Hypecoum procumbens,** *L.*
Lembet, in flower, 3 and 4-17, *Turner* 23a.
*Distr.* Mediterranean Region.
Balkans: Greece, Bulg.

*Hypecoum grandiflorum,* Benth. Lembet, in flower 3 and 4-17, *Turner* 23.
*Fumaria officinalis,* L. Lembet, in flower 3-17, *Turner* 12.

**Capparis sicula,** *Dub.*
Lembet, in flower, 7-17, *Turner* 190.
*Distr.* S.E. Eur., Orient.
Balkans: Greece, Maced.

**Reseda lutea,** *L.*
Lembet, in flower, 4-17, *Turner* 48.
*Distr.* Cent. and S. Eur., N. Afr., Orient.
Balkans: General.

**Reseda alba,** *L.*
Lembet, in flower, 6-17, *Turner* 166.
*Distr.* S. and W. Eur., N. Afr., Orient.
Balkans: Greece.

*Viola Kitaibeliana,* R. et S. Lembet, in flower 3 and 4–17, *Turner* 26; Kato, in flower, 4–17, *Turner* 291.

**Lepidium campestre,** *L.*
Lembet, in flower and fruit, 5-17, *Turner* 81.
*Distr.* Eur., Orient.
Balkans: Greece, Maced., Bulg.

**Clypeola jonthlaspi,** *L.* var. **intermedia,** *Hal.*
Lembet, in flower and fruit, 4-17, *Turner* 28.
*Distr.* (of var.). Greece, Smyrna.

**Camelina rumelica,** *Vel.* (probably the same as *C. microcarpa,* Andrz.).
Struma Plain, 2 km. N.E. of Orljak, in flower and fruit, 26-4-17, *Turrill* 101.
*Distr.* Maced., Thrace, Bulg.

**Raphanus Raphanistrum,** *L.*
Lembet, in flower, 4 and 5-17, *Turner* 58.
*Distr.* Eur., Orient, N. Afr., and more or less spontaneous in many temperate regions.
Balkans: Greece, Maced.

**Sisymbrium officinalis,** *Scop.*
Lembet, in flower and fruit, 5-17, *Turner* 107.
*Distr.* Eur., N. Afr., Orient.
Balkans: Greece, Maced., Serb., Bulg.

**Lepidium graminifolium,** *L.*
Lembet, in flower and fruit, 7-17, *Turner* 187.
*Distr.* Cent. and S. Eur., Orient.
Balkans: Greece, Maced., Bulg., Thrace.

**Aethionema graecum,** *Boiss. et Heldr.* var. **pseudogracile,** *Hal.*
Lembet, in flower and young fruit, 4-17, *Turner* 36; Kato, in flower, 4-17, *Turner* 293.
*Distr.* (of var.). Greece, Epirus, Maced., Bulg.

**Capsella grandiflora,** *Boiss.*
Ano, in flower, spring 1918, *Turner* 302.
*Distr.* Greece, Epirus, Corfu, Thessaly.

**Capsella thracica,** *Vel.*
Lembet, in flower and fruit, 3-17, *Turner* 5, 9.
*Distr.* Maced., Thrace, Bulg.

*Cardamine graecea,* L. Ano-Krusones, in flower and young fruit, 4-17, *Turner* 319.
*Alyssum micranthum,* M.B. Lembet, in flower, 3-17, *Turner* 4.

**Erophila verna,** *Meyer,* var. **brachycarpa,** *Jord.* (pro. sp.).
Lembet, in flower and young fruit, 3-17, *Turner* 19.
*Distr.* Cent. Eur., Orient.
Balkans: Greece.

*Erysimum repandum,* L. Ano, in flower, spring 1918, *Turner* 295.

**Berteroa orbiculata,** *DC.*
Lembet, yellow flowers, 4-17, *Turner* 27.
*Distr.* Maced., Thrace.

**Berteroa incana,** *L.*, var. **stricta,** *Turrill.* (comb. nov.) *Berteroa stricta,* Boiss. et Heldr. *B. orbiculata,* DC. var. *stricta,* Boiss. *B. incana,* DC., var. *trichocarpa,* Rohlena in Mag. Bot. Lap. vi. 1907, p. 151.
Ano, in flower and fruit, spring 1918, *Turner* 307. S.E. of Karamudli, white flowers, in flower and fruit, 20-6-17, *Turrill* 430.
*Distr.* (of var.). Thessaly, Maced., Thrace, Bulg., Mtn. (prob. also Alb. and Bosnia).

*Hypericum olympicum,* L. Lembet, in flower, 5 and 6-17, *Turner* 113; Stavros, in flower, 8-17, *Turner* 228.

**Hypericum crispum,** *L.*
Lembet, in flower, 7-17, *Turner* 181.
*Distr.* S.E. Eur., Orient.
Balkans: Greece, Maced., Thrace.

*Hypericum perforatum,* L. Lembet, in flower, 6-17, *Turner* 171.
*Velezia rigida,* L. Lembet, in flower, 7-17, *Turner* 180.
*Dianthus tenuiflorus,* Griseb. Lembet, in flower, 5-17, *Turner* 126.

**Dianthus gracilis,** *Sibth.* var. **armerioides,** *Griseb.*
Lembet, in flower, 6-17, *Turner* 148.
*Distr.* (of var.). Maced., Bulg. (?).

**Dianthus pinifolius,** *S. et S.*
Lembet, in flower, 6-17, *Turner* 152.
*Distr.* Thessaly, Epirus, Maced., Thrace, Bulg., Lemnos.

*Kohlrauschia prolifera*, Rchb. fil. Stavros, in flower, 7-17, *Turner* 225.

The specimens which flowered at Kew, 15-6-18, and were grown from seed collected on the southern slopes of Krusa Balkan, 30-6-17, *Turrill* (seed-number), 66, are *Kohlrauschia velutina*, Rchb.

*Tunica illyrica*, Boiss. Lembet, in flower, 6-17, *Turner* 153.

*Saponaria officinalis*, *L.* Lembet, in flower, 7-17, *Turner* 183. A form with double flowers.

**Saponaria officinalis,** *L.* var. **glaberrima,** *Ser.* in DC. Prod. I. p. 365.

Stavros, in flower, 7-17, *Turner* 221.

*Distr.* (of var.). Here and there with the type.

*Silene subconica*, Friv. Lembet, in flower 5-17, *Turner* 91.

**Silene lydia,** *Boiss.* (*S. Harrisii*, Turrill, in *Kew Bull.* 1918. p. 267).

Struma Plain and Northern slopes of Krusa Balkan, in flower, 4 and 5-18; *Harris* 164; Struma Plain, 2 km. S.E. of Orljak, pink flowers, 26-4-17, *Turrill* 103.

*Distr.* Western Asia Minor.

*Silene trinervia*, Seb. et Maur. Stavros, in flower, 7-17, *Turner* 218.

*Silene gallica*, L. Lembet, in flower, 4 and 5-17, *Turner* 52, 61.

**Silene graeca,** *Boiss. et Sprun.*

Lembet, in flower, 5 and 6-17, *Turner* 112.

*Distr.* Greece.

**Cucubalus bacciferus,** *L.*

Stavros, in flower, 7-17, *Turner* 217.

*Distr.* Cent. and S. Eur., Orient.

Balkans: Maced., Thrace, Bulg.

*Agrostemma Githago*, L. Lembet, in flower, 5-17, *Turner* 78.

**Alsine recurva,** *All.*

Lembet, in flower, 5-17, *Turner* 95. Struma Plain and northern slopes of the Krusa Balkan, in flower and fruit, 5-17, *Harris* 307; 8-10 km. N. of Salonika, in flower, 13-4-17, *Turrill* 15.

*Distr.* Cent. and S. Eur. (generally on mountains).

Balkans: General as far south as Thessaly.

**Spergularia diandra,** *Guss.*

Lembet, in flower, 5-17, *Turner* 116.

*Distr.* S. Eur., N. Afr., Orient, N. Asia, Abyssinia.

Balkans: Greece.

**Polygala nicaeensis,** *Risso*, subsp. **mediterranea,** *Chodat.*

Ano-Krusones, in flower, 4-18, *Turner* 327.

*Distr.* (of subsp.). Spain, S. Fr., It., S. Tyrol, W. Croatia, Dalm., Thrace, Sicily, Alg., Tunis.

*Cistus villosus*, L. Lembet, in flower, 5-17, *Turner* 125.

*Helianthemum salicifolium*, Pers. Lembet, in flower, 3-17, *Turner* 7.

*Malva silvestris*, L. Lembet, in flower, 5-17, *Turner* 74.

*Althaea officinalis*, L. Stavros, in flower, 7-17, *Turner* 209.

**Althaea cannabina,** *L.*

Stavros, in flower and fruit, 9-17, *Turner* 256; Ano, in flower, 9-17, *Turner* 309.

*Distr.* S. Eur., Orient.

Balkans: Greece (Thessaly, Epirus), Maced., Thrace, Bulg.

*Geranium molle*, L. Lembet, in flower and young fruit, 3-17, *Turner* 8; Lembet, in flower and young fruit, 5-17, *Turner* 68.

*Erodium cicutarium*, L'Her. Lembet, in flower, 3 and 4-17, *Turner* 24; Lembet, in flower and fruit, 5-17, *Turner* 94.

**Erodium ciconium,** *Ait.*

Lembet, in flower and fruit, 5-17, *Turner* 65.

*Distr.* S. Eur., Orient, N. Afr.

Balkans: Greece, Maced., Thrace.

*Linum flavum*, L. var. *thracicum*, Griseb. Ano-Krusones, in flower, 4-17, *Turner* 334.

*Linum gallicum*, L. Lembet, in flower and fruit, 6-17, *Turner* 170.

**Linum austriacum,** *L.* (?).

Ano-Krusones, in flower, 4-17, *Turner* 298, 321.

*Distr.* Cent. and S. Eur., Orient.

Balkans: Greece, Maced., Alb., Bulg.

*L. austriacum*, L. is very closely related to *L. perenne*, L., and in the absence of ripe fruits the identification of the above specimens is tentative.

**Linum hirsutum,** *L.*

Ano-Krusones, in flower, 4-17, *Turner* 330.

*Distr.* S.E. Eur., Orient.

Balkans: Maced., Thrace, Bulg., Serb., Alb., Roum.

*Linum tenuifolium*, L. Ano-Krusones, in flower, 4-18, *Turner* 329.

*Peganum Harmala*, L. Lembet, in flower, 6-17, *Turner* 168.

*Tribulus terrestris*, L. Lembet, in flower and fruit, 6-17, *Turner* 144; Stavros, in flower and fruit, 7-17, *Turner* 215.

The indumentum of this plant is variable. *Turner* 144 has stiff bristle-like hairs 1 mm. in length but no dense short white pubescence such as occurs on the fruits of *Turner* 215.

*Paliurus Spina Christi*, Mill. Stavros, 8-17, *Turner* 240.

*Genista depressa*, M.B. Lembet, in flower, 5-17, *Turner* 102.

*Ononis spinosa*, L. Lembet, in flower, 6-17, *Turner* 155.

**Trigonella monspeliaca,** *L.*

Lembet, in flower, 3-17, *Turner* 6.

*Distr.* Cent. and S. Eur., N. Afr., Orient.

Balkans: General.

*Medicago minima*, var. *mollissima*, Koch. Lembet, in flower and fruit, 5-17, *Turner* 70.

*Medicago orbicularis*, All. Lembet, in flower and fruit, 4 and 5–17, *Turner* 59.

*Medicago falcata*, L. Lembet, in flower, 6-17, *Turner* 167.

*Medicago rigidula*, Desr. Lembet, in flower, 3 and 4–17, *Turner* 10, 34.

**Melilotus sulcata,** *Desf.* var. **segetalis,** *Rouy et Fouc.*
Lembet, in flower, 4 and 7-17, *Turner* 38, 184. 8 to 10 km. N. of Salonika, in flower, 13-4-17, *Turrill* 37.
*Distr.* (of var.). N.W. Afr., Spain, Corsica, Sardinia, Cent. and S. Italy, Sicily.

*Melilotus indica,* All. Lembet, in flower, 4-17, *Turner* 41.
*Melilotus alba,* Desr. Stavros, in flower, 9-17, *Turner* 227.
*Trifolium procumbens,* L. Lembet, in flower, 5-17, *Turner* 73.
*Trifolium resupinatum,* L. Lembet, in flower, 5-17, *Turner* 66.
*Trifolium stellatum,* L. Lembet, in flower, 5-17, *Turner* 77.
*Trifolium angustifolium,* L. Lembet, in flower, 5-17, *Turner* 82.
*Lotus aegeus,* Boiss. Lembet, in flower, 6-17, *Turner* 169.

**Lotus corniculatus,** *L.* var. **stenodon,** *Boiss.*
Stavros, in flower, 9-17, *Turner* 260.
*Distr.* (of var.). Greece, Maced.

*Colutea arborescens,* L. Ano, in flower, 5-18, *Turner* 308.
*Astragalus sesameus,* L. Lembet, in flower, 5-17, *Turner* 97.

**Hedysarum coronarium,** *L.*
Lembet, in flower, 5-17, *Turner* 131.
*Distr.* Spain to Greece.
Balkans: Greece.

**Onobrychis Caput Galli,** *Lam.* var. **depressa,** *Beck.*
Lembet, in flower and fruit, 5-17, *Turner* 93.
*Distr.* (of var.). Sicily.
This a variety with glabrous fruits.

*Onobrychis gracilis,* Bess. Lembet, in flower, 5-17, *Turner* 86.
*Vicia grandiflora,* Scop. Ano, in flower, 4–18, *Turner* 310.
*Vicia lathyroides,* L. Lembet, in flower, 3–17, *Turner* 18.
*Lathyrus Aphaca,* L. Ano, *Turner* 296.
*Lathyrus sativus,* L. Lembet, in flower, 5–17, *Turner* 71.
*Lathyrus Cicera,* L. Grown from seeds collected near Mirova, 13-6-17, *Turrill* (seed-number) 47, flowered and fruited at Richmond 2-8-19.
*Orobus atropurpureus,* Desf. Lembet, in flower, 5-17, *Turner* 72.

**Cercis Siliquastrum,** *L.*
Stavros, 9-17, *Turner* 282.
*Distr.* S. Eur., Orient.
Balkans: Greece, Maced., Thrace.

**Potentilla taurica,** *Willd.*
Lembet, in flower, 5-17, *Turner* 110.
*Distr.* S.E. Eur., Asia Minor, Caucasus.
Balkans: Greece, Maced., Bulg., Thrace (?).

*Potentilla hirta,* L. Lembet, in flower, 5-17, *Turner* 111.
*Agrimonia odorata,* Mill. Lembet, in flower and young fruit, 6-17, *Turner* 160.

**Poterium rhodopeum,** *Vel.*
Lembet, in flower, 5-17, *Turner* 128.
*Distr.* Maced., Bulg.

**Poterium spinosum,** *L.*
Stavros, 8-17, *Turner* 234.
*Distr.* Sardinia to Thrace, Orient.
Balkans: Greece, Maced., Thrace.

**Sedum acre,** *L.* var. **neglectum,** *Hal.*
Lembet, in flower, 7-17, *Turner* 182.
*Distr.* S.E. Eur.
Balkans: Greece, Maced.

*Lythrum Salicaria,* L. Stavros, in flower, 7 and 8-17, *Turner* 211, 258.
The former runs down to Koehne's var. *genuinum,* forma a, subforma dd, which he only records from Germany (Rhine Province). The latter is the variety *tomentosum,* DC. See Koehne in Engler's Pflanzenr. iv. 21. p. 77.

**Herniaria incana,** *Lam.*
Lembet, in flower, 6-17, *Turner* 150.
*Distr.* S. Eur., N. Afr., Orient.
Balkans: General.

**Ecballium Elaterium,** *Rich.*
Lembet, in flower, 6-17, *Turner* 149.
*Distr.* Medit. Reg. eastwards to Caucasus.
Balkans: Greece, Maced., Bulg., Herz.

**Eryngium creticum,** *Lam.*
8½ km. N. of Salonika, in flower, 7-17, *Turner* 201; Stavros, in young fruit, 9-17, *Turner* 281.
*Distr.* S.E. Eur., Orient, N.E. Afr.
Balkans: Greece, Maced., Thrace.

**Bupleurum junceum,** *L.*
Lembet, in flower and young fruit, 8-17, *Turner* 212.
*Distr.* S. Eur.
Balkans: Epirus, Thessaly, Maced., Thrace, Bulg.

**Bupleurum Fontanesii,** *Guss.* (See Wettstein, Bibl. Bot., Heft 26, p. 57).
Lembet, in flower, 6-17, *Turner* 138; Chalcidice (?), *Tozer* (see *Kew Bull.,* 1920, p. 30).
*Distr.* S. Ital., Sicily, Sardinia, Balkans, Asia Minor, Palestine, Egypt.
Balkans: Greece, Maced., Thrace, Bulg.

**Crithmum maritimum,** *L.*
Stavros, near the sea, 8-17, *Turner* 245.
*Distr.* W. Eur., Medit. Region, N. Afr.
Balkans: Greece, Maced., Thrace.

*Tordylium officinalis,* L. Lembet, in flower, 5-17, *Turner* 115.

**Tordylium Apulum,** *L.*
Lembet, in fruit, 5-17, *Turner* 130.
*Distr.* S. Eur., N. Afr., Asia Minor.
Balkans: Greece, Maced., Thrace, Herz.

*Caucalis latifolia,* L. Lembet, in flower, 4 and 5-17, *Turner* 54.
*Caucalis leptophylla,* L. Lembet, in flower and fruit, 5-17, *Turner* 75.

**Torilis heterophylla,** *Guss.*
Lembet, in flower, 5-17, *Turner* 118.
*Distr.* S. Eur., Orient.
Balkans: Greece, Thrace, Bulg.

**Torilis nodosa,** *Gaertn.*
Lembet, in flower, 5-17, *Turner* 63.
*Distr.* S. and Cent. Eur., N. Afr., Orient.
Balkans: Greece, Maced., Bulg.

**Daucus Bocconei,** *Guss.* (*D. communis,* Ruoy et Cav., subsp. *Bocconei,* Rouy et Fouc., Fl. de Fr. VII., p. 234; *D. Carota,* L. var. *Boceonei,* Fiori et Beg. in Fiori e Paoletti, Fl. Anal. d'It. II. p. 186).
Stavros, in flower, 7-17, *Turner* 226.
*Distr.* S. Fr., It., Sic., Istria, Crete, Algeria.

*Sambucus Ebulus,* L. Stavros, in flower, 8-17, *Turner* 237.

**Galium Aparine,** *L.*
Lembet, in fruit, 5-17, *Turner* 64.
*Distr.* Eur., N. Afr., Orient.
Balkans: General.

**Sherardia arvensis,** *L.*
Lembet, in flower, 4 and 5-17, *Turner* 30, 109.
*Distr.* Eur., N. Afr., Orient.
Balkans: Greece, Maced., Bulg.

*Galium verum,* L. Lembet, in flower, 6-17, *Turner* 147; Stavros, in flower, 7-17, *Turner* 213.
*Galium Cruciata,* Scop. Lembet, in flower, 6-17, *Turner* 140.

**Fedia Cornucopiae,** *Gaertn.* var. **graciliflora,** (*Fisch. et Mey.*).
Ano-Krusones, in flower, 4-18, *Turner* 324.
*Distr.* S. Eur., N. Afr.
Balkans: Greece (rare).

*Knautia orientalis,* L. Lembet, in flower, 5 and 6-17, *Turner* 87, 176.
*Scabiosa ucranica,* L. Lembet, in flower, 6-17, *Turner* 159.
*Callistemma palaestinum,* (L.) Heldr. Lembet, in flower, 5 and 6-17, *Turner* 99, 141; Ano-Krusones, in flower, 4-18, *Turner* 331.
A good deal of confusion has existed regarding this plant. Linnaeus described in his Mantissa prima, p. 37 (1767) a plant from Palestine as *Scabiosa palaestina.* In his Mantissa altera, p. 197 (1771), he described another plant from the same country as *Knautia palestina.* The former is rightly placed in the genus *Scabiosa,* but the latter is now placed in the genus *Callistemma.* Sibthorp in his Fl. Graecae Prod. I. p. 83, and Flora Graeca II.

p. 9, tab. 109, transferred *Knautia palaestina*, L. to the genus *Scabiosa* under the name *S. brachiata*. The plant described in the same work, p. 84, and in Flora Graeca II. p. 10, t. 110, as *Scabiosa Sibthorpiana* is generally considered synonymous with *Callistemma palaestina*, Heldr., or a variety of it. Boissier (Fl. Or. III. p. 146, 1875) keeps up the genus *Callistemma* but adopts Sibthorp's specific name, thus making the combination *Callistemma brachiatum*.

Of the specimens quoted above *Turner* 99 consists of small plants of typical *Callistemma palaestinum*, Heldr. (*Scabiosa brachiata*, Sibth.), while *Turner* 141 and 331 represent *Callistemma palaestinum*, var. *Sibthorpianum*, comb. nov. (*Scabiosa Sibthorpiana*, Sibth. Fl. Gr. Prod. I. p. 83 et Fl. Gr. III. p. 10, t. 110).

*Achillea clypeolata*, S. et S. Lembet, in flower, 5-17, *Turner* 114.

*Achillea crithmifolia*, W. K. Stavros, in flower, 7-17, *Turner* 208.

*Anthemis tinctoria*, L. Lembet, in flower, 6-17, *Turner* 156.

*Echinops microcephalus*, S. et S. Lembet, in flower, 7-17, *Turner* 191.

*Carlina lanata*, L. 8½ km. N. of Salonika, in flower, 7-17, *Turner* 200.

*Xeranthemum annuum*, L. Lembet, in flower, 6-17, *Turner* 158.

**Artemisia scoparia**, *W. K.*
Stavros, in flower, 9-17, *Turner* 262.
*Distr.* Cent. and E. Eur., Orient, N. and E. Asia.
Balkans: Thessaly, Maced., Bulg.

*Matricaria Chamomilla*, L. Lembet, in flower, 4-17, *Turner* 50.

**Anthemis Triumfetti**, *DC.*
Lembet, in flower, 4-17, *Turner* 40, 49.
*Distr.* S. Eur., Orient.
Balkans: Serb., Herz., Thrace.

*Anthemis rigescens*, Willd., does not appear to be specifically distinct from this species.

**Inula viscosa**, *Ait.*
Stavros, in flower, 9-17, *Turner* 263.
*Distr.* S. Eur., N. Afr., Orient.
Balkans: Greece, Maced.

*Chondrilla juncea*, L. Stavros, in flower and fruit, 8-17, *Turner* 231.

*Cichorium Intybus*, L. var. *glabratum*, Presl. Lembet, in flower 6-17, *Turner* 139.

*Scolymus hispanicus*, L. Ano, in flower, 1918, *Turner* 306.

*Chrysanthemum segetum*, L. Lembet, in flower, 4 and 5-17, *Turner* 56.

**Chrysanthemum coronarium**, *L.*
Lembet, in flower, 4 and 5-17, *Turner* 57.
*Distr.* S. Eur., N. Afr., Orient.
Balkans: Greece.

**Filago germanica,** *L.*, var. **eriocephala,** *Boiss.*
Lembet, in flower, *Turner* 188.
*Distr.* (of var.). S. Eur., Orient.
Balkans: Greece.

*Xanthium spinosum,* L. Lembet, 5-17, *Turner* 100.

**Tragopogon (Geropogon) glaber,** *L.*
Lembet, in flower, 5-17, *Turner* 96.
*Distr.* S. Eur., N. Afr., Orient.
Balkans: Greece.

*Tragopogon porrifolius,* L. Lembet, in flower, 5-17, *Turner* 121.

*Asteriscus aquaticus,* L. Lembet, in flower, 5-17, *Turner* 108.

**Diotis maritima,** *Sm.*
Stavros, in flower, 8-17, *Turner* 239.
*Distr.* W. and S. Eur., N. Afr., Orient.
Balkans, Greece, Maced., Thrace.

**Centaurea paniculata,** *L.* var. **macedonica,** *Griseb.*
Krusa Balkan, in flower, 6 and 7-18, *Harris* 349; Lembet, in flower 6-17, *Turner* 178; 8½ km. N. of Salonika, in flower, 7-17, *Turner* 197.
*Distr.* Epirus, Thessaly, Maced.
An unfortunate amount of synonymy has grown up round this plant. Grisebach first described it (Spic. Fl. Rumel. II. p. 240) under the name retained here. Nyman (Conspec. Fl. Eur. p. 427) raised it to the rank of a species under the name *C. Grisebachii,* though he also quotes it as a synonym of *C. maculosa,* Lam. (l.c. p. 426). Boissier (Fl. Orient. III., p. 644, places it as a variety (var. *macedonica*) of *C. graeca,* Boiss. et Sprun. non Griseb. Halácsy (in Bull. Herb. Boiss. VI., pp. 594-596) described it as *C. pallidior,* var. *pallidissima,* Hal. *C. macedonica,* Hal. and *C. confusa,* Hal., but in his Consp. Fl. Graec., II., p. 147, he retains the name *C. macedonica* (Griseb.), Hal.

*Centaurea sublanata,* Boiss. Stavros, in flower, 7-17, *Turner* 219; in flower, 9-17, *Turner* 249.
*Centaurea salonitana,* Vis. Lembet, in flower, 7-17, *Turner* 193.
*Centaurea solstitialis,* L. Lembet, in flower, 6-17, *Turner* 136.
*Centaurea Calcitrapa,* L. Lembet, in bud, 5–17, *Turner* 89; in flower, 6-17, *Turner* 154.

**Centaurea diffusa,** *Lam.*
Lembet, in bud and flower, 6-17, *Turner* 133, 177.
*Distr.* S.E. Eur., Orient.
Balkans: Thessaly, Maced., Thrace, Bulg.

**Calendula arvensis,** *L.*
Lembet, in flower, 3-17, *Turner* 13.
*Distr.* S. Eur., N. Afr., Orient.
Balkans: Greece, Maced.

**Calendula suffruticosa,** *Vahl.*
Lembet, in flower, 4-17, *Turner* 33.
*Distr.* Spain, S. It., Sicily, Thrace.

I have failed to distinguish this species from *C. Noeana*, Boiss., and *C. fulgida*, Raf.

**Pulicaria dysenterica,** *Gaertn.*
Stavros, in flower, 7-17, *Turner* 222.
*Distr.* Eur., N. Afr., Orient.
Balkans: Greece, Thrace, Bulg.

*Carduus pycnocephalus*, L. Ano, in flower, 1918, *Turner* 294.

**Galactites tomentosa,** *Moench.*
Lembet, in flower, 6-17, *Turner* 137.
*Distr.* S. Eur., N. Afr.
Balkans: Greece.

**Cirsium creticum,** *D'Urv.*
Ano, in flower, spring 1918, *Turner* 305.
*Distr.* S. Eur., Orient.
Balkans: Greece, Maced.

**Cirsium italicum,** *DC.*
Stavros, 9-17, *Turner* 253.
*Distr.* Corsica, Sardinia, Greece, Bithynia.

**Tyrimnus leucographus,** *Cass.* (*Carduus leucographus*, L.).
Lembet, in flower, 5-17, *Turner* 85; seeds collected between Turica and Kopriva, 30-5-17, flowered at Kew, 15-7-18, *Turrill* (seed number) 22.
*Distr.* S. Eur., Orient.
Balkans: Greece, Maced., Thrace, Bulg.
This plant, determined from description, was recorded in *Kew Bulletin*, 1918, p. 301, as *Cardus pycnocephalus*, L., var. *cinereus*, Boiss.

**Chrysanthemum Myconis,** *L.*
Lembet, in flower, 5-17, *Turner* 101.
*Distr.* S. Eur., N. Afr., Orient.
Balkans: Greece, Alb.

**Cardopatium corymbosum,** *Pers.*
Lembet, in flower, 7-17, Turner 179.
*Distr.* S.E. Eur., Orient.
Balkans: Greece, Maced., Thrace.

**Lactuca saligna,** *L.*
8½ km. N. of Salonika, 7-17, *Turner* 195.
*Distr.* Cent. and S. Eur., N. Afr., Orient.
Balkans: Greece, Maced., Bulg.

**Launaea mucronata,** *Muschler.*
Lembet, in flower, 6-17, *Turner* 176a.
*Distr.* Egypt, Orient.

*Campanula phrygia*, Jaub. et Spach. Lembet, in flower, 5-17, *Turner* 80.

The var. *serbica*, Adamović in Allg. Bot. Zeitschr., 1896, p. 118, is doubtfully distinct from the type. *Turner* 80 consists of two plants, one glabrous except in the lower part, the other densely white pubescent up to the receptacles and calyx lobes.

*Campanula lingulata*, W.K. Lembet, in flower, 5-17, *Turner* 98.

*Campanula athoa*, Boiss. Stavros, in flower, 7-17, *Turner* 210.

*Jasione Heldreichii*, Boiss. et Orph. Stavros, in flower, 8-17, *Turner* 232.

*Specularia Speculum*, A. DC. var. *pubescens*, A. DC. Ano-Krusones, in flower, 4-18, *Turner* 317.

**Erica arborea**, *L.*
Tasli, in flower, 2-18, *Turner* 314.
*Distr.* Cent. and S. Eur., N. Afr., N. Asia Minor.
Balkans: Greece, Maced., Thrace.

*Cyclamen neapolitanum*, Ten. Ano, flowers, 1918, *Turner* 300.

*Anagallis coerulea*, Schreb. Lembet, in flower, 4-17, *Turner* 45.

*Lysimachia punctata*, L. Lembet, in flower, 6-17, *Turner* 161.

**Samolus Valerandi**, *L.*
Lembet, in flower, 6-17, *Turner* 143.
*Distr.* Nearly cosmopolitan.
Balkans: General.

*Plumbago europaea*, L. Stavros, in flower, 9-17, *Turner* 248.

*Jasminum fruticans*, L. Lembet, in flower, 5-17, *Turner* 60.

**Fraxinus oxycarpa**, *Willd.*, var. **rostrata**, *Rouy.*
Stavros, in fruit, 9-17, *Turner* 271.
*Distr.* (of var.). S. Eur.
Balkans: Albania.

**Cynanchum acutum**, *L.*
Lembet, small apparently white flowers, 7-17, *Turner* 192; Stavros, larger pink flowers, 7-17, *Turner* 216; Stavros, leaves only, 9-17, *Turner* 236.
*Distr.* S. Eur., N. Afr., Orient, N. Asia.
Balkans: Greece, Maced., Thrace, Bulg.

*Erythraea Centaurium*, L. Lembet, in flower, 6-17, *Turner* 174.

**Erythraea tenuiflora**, *Hoffm. et Link.*
Stavros, in flower, 8-17, *Turner* 230; south of Karamudli, pink flowers, 15-7-17, *Turrill* 494.
*Distr.* S. Eur., Orient.
Balkans: Greece, Maced.

**Erythraea pulchella**, *Fr.*
Lembet, in flower, 6-17, *Turner* 175.
*Distr.* Eur., N. Afr., Orient.
Balkans: Greece, Maced., Bulg.

**Erythraea spicata**, *Pers.*
Stavros, pink flowers, 9-17, *Turner* 257.
*Distr.* S. Eur., N. Afr., Orient.
Balkans: Greece, Bulg.

**Heliotropium europaeum**, *L.*
Stavros, in flower and fruit, 9-17, *Turner* 264.

*Distr.* Cent. and S. Eur., N. Afr., Orient.
Balkans: Greece, Bulg.

*Heliotropium suaveolens*, M.B. Lembet, in flower, 5 and 6-17, *Turner* 119, 164.

**Symphytum ottomanum,** *Friv.*
Lembet, in flower, 4-17, *Turner* 37.
*Distr.* Hungary, Greece, Serb., Bulg.

**Symphytum bulbosum,** *Schimp.*
Ano, in flower, 4-18, *Turner* 318; 8-10 km. N. of Salonika, in flower, 13-4-17, *Turrill* 43.
*Distr.* Cent. and S. Eur.
Balkans: Greece, Maced.

**Borrago officinalis,** *L.*
Lembet, in flower, 4-17, *Turner* 44.
*Distr.* Cent. and S. Eur., N. Afr., Orient.
Balkans: Greece.

*Anchusa italica*, Retz. Lembet, in flower, 5-17, *Turner* 83.
*Anchusa officinalis*, L. Lembet, in flower, 6-17, *Turner* 172.

**Lycopsis variegata,** *L.*
Lembet, in flower, 3 and 4-17, *Turner* 25.
*Distr.* S.E. Eur., Orient.
Balkans: Greece, Maced.

**Alkanna tinctoria,** *Tausch.*
Lembet, in flower, 4-17, *Turner* 32.
*Distr.* S. Eur., N. Afr.
Balkans: Greece, Maced., Bulg.

*Myosotis cadmea*, Boiss. Lembet, in flower, 3-17, *Turner* 21; Kato, in flower, 4-18, *Turner* 292.
*Myosotis collina*, Hoffm. Lembet, in flower, 3-17, *Turner* 3, 17; Ano, in flower, spring 1918, *Turner* 297.
*Lithospermum apulum*, Vahl. Lembet, in flower, 5-17, *Turner* 84.

**Onosma echioides,** *L.* (*O. tauricum*, Auct. non Pallas).
Ano-Krusones, in flower, 4-18, *Turner* 332.
*Distr.* Cent. and S. Eur., N. Afr., Orient.
Balkans: General.
The various forms of *Onosma* found in the Balkans require further elucidation, and it has been thought best to retain the Linnean name for the present, using it in a wide sense. The plants listed as *O. taurica*, Pall. in *Kew Bull.* 1918, p. 310, agree with the plants generally placed under this species by European botanists, but all differ from the Crimean plant in having the corollas externally pubescent or puberulous.

*Echium italicum*, L. Lembet, in flower, 7-17, *Turner* 185.
*Echium plantagineum*, L. Lembet, in flower, 5-17, *Turner* 76.
*Convolvulus tricolor*, L. Lembet, in flower, 4 and 5-17, *Turner* 43, 123.

**Solanum nigrum,** *L.*
Lembet, in flower and fruit, 7-17, *Turner* 189.
*Distr.* Nearly cosmopolitan.
Balkans: General.

**Verbascum sinuatum,** *L.*
Lembet, in flower, 6-17, *Turner* 132.
*Distr.* S. Eur., N. Afr., Orient.
Balkans: Greece, Maced., Thrace, Bulg.

**Verbascum rigidum,** *Boiss. et Heldr.*
Lembet, in flower, 5-17, *Turner* 67.
*Distr.* Greece, Maced.

*Linaria genistaefolia*, Mill. Lembet, in flower, 6-17, *Turner* 165.
*Linaria Pelisseriana*, Mill. Lembet, in flower, 5-17, *Turner* 88.
*Digitalis lanata*, Ehrh. Lembet, in flower, 6-17, *Turner* 157.

**Veronica austriaca,** *L.*
Lembet, bright blue flowers, 5-17, *Turner* 92.
*Distr.* S.E. Eur., Orient.
Balkans: Greece, Maced., Thrace, Bulg.

**Veronica Chamaedrys,** *L.* var. **rigida,** *Turrill*, var. nov. a planta typica caulibus rigidioribus ramosioribus, foliis petiolatis, pedicellis brevioribus praecipue differt.

*Planta* biennis, caulibus adscendentibus ramosis rigidis inferne pilis in lineis duabus dispositis instructis superne undique hirsutis. *Folia* oblongo-ovata, 2·5 cm. longa, 2 cm. lata, margine inciso-dentata, pagina superiore leviter hispida vel glabra nervis impressis, inferiore in nervis prominentibus valde hispida; petiolus 5–6 mm. longus. *Inflorescentia* 3–12 cm. longa; bracteae lineari-lanceolatae, 5 mm. longae; pedicelli floriferi 2 mm. longi. *Infructescentia* usque ad 3·4 dm. longa; pedicelli fructiferi 4 mm. longi. *Calyx* 5 mm. longa, sepalis costis extra prominentibus instructis.

In flower and fruit at Kew, 10-7-19. Grown from seeds collected on the southern slopes of the Krusa-Balkan, north of Karamudli, 18-6-17, *Turrill* (seed number) 49.

This plant has not been exactly matched with any plant at Kew and is certainly distinct, at least as a variety, from our common *Veronica Chamaedrys*. A plant mentioned (but without a varietal name) by Velenovsky in his Flora Bulgarica, p. 429, appears to approach it in some characters. His description is incomplete and is as follows: Specimina de m. Rilo forman caule rigidiore pedicellis brevioribus foliis profunde inciso-dentatis sistunt. Cetera cum iis Europae mediae optime conveniunt.

A petiolated variety is described by Willkomm and Lange (in Flora, 1852, p. 262, and in Fl. Hispanica II., p. 602) from Spain and named *procera*, but the other characters do not agree with those shown by our plant.

*Veronica Anagallis*, L. Lembet, in flower, 5-17, *Turner* 122.
A form with smaller upper leaves than in the type.
*Bartsia latifolia*, S. et S. Lembet, in flower, 5-17, *Turner* 117.

**Odontites serotina,** *Rchb.*
Stavros, in flower, 9-17, *Turner* 251.
*Distr.* Cent. and S.? Eur., Orient, N. Asia.
Balkans: Greece, Maced., Bulg.

*Orobanche nana,* de Noé, Lembet, blue flowers, 5-17, *Turner* 104.

**Vitex Agnus Castus,** *L.*
Stavros, in flower, 7-17, *Turner* 214.
*Distr.* S. Eur., N. Afr., Orient.
Balkans: Greece, Maced., Thrace.

*Thymus Chaubardi,* Boiss. et Heldr. Lembet, in flower, 5-17, *Turner* 124.
*Thymus Marschallianus,* Willd. Lembet, in flower, 5-17, *Turner* 62.

**Micromeria juliana,** *L.*
Lembet, in flower, 5-17, *Turner* 129.
*Distr.* S. Eur., N. Afr., Orient.
Balkans: Greece, Maced., Thrace, Alb., Herz.

**Mentha rotundifolia,** *L.*
Stavros, in flower, 8-17, *Turner* 229.
*Distr.* Cent. and S. Eur., N. Afr., Bithynia.
Balkans: Greece, Thrace.

**Lamium bifidum,** *Cyr.*
Ano-Krusones, in flower, 4-18, *Turner* 322.
*Distr.* S. Eur. from Corsica and Sardinia to Macedonia.
Balkans: Greece, Bulgaria (sub-sp. *balcanicum,* Vel.).

*Lamium amplexicaule,* L. Lembet, in flower, 3 and 4-17, *Turner* 16, 35.
*Mentha Pulegium,* L. Stavros, in flower, 7-17, *Turner* 207.
*Salvia amplexicaulis,* Rchb. Lembet, in flower, 6-17, *Turner* 135.
*Salvia clandestina,* L. Lembet, in flower, 5-17, *Turner* 20, 69.
*Salvia Horminum,* L. Lembet, in flower, 4 and 5-17, *Turner* 55.

**Mentha longifolia,** *Huds.* var. **Sieberi** (*Koch.* pro. sp.) *Hal.* (*Mentha sylvestris,* var. *stenostachya,* Boiss. Fl. Or. IV. p. 543). Stavros, in flower, 7-17, *Turner* 206; Struma Plain and Krusa Balkan, in flower, 6-18, *Harris,* 338; Paprat District, Krusa Balkan, in flower, 6-18, *Russell,* 75; South-east of Karamudli, southern slopes of Krusa Balkan, in flower, 20-7-17, *Turrill,* 422.
*Distr.* S.E. Eur., Orient.
Balkans: General.

*Marrubium peregrinum,* L. Lembet, in flower, 6-17, *Turner* 163.
*Phlomis pungens,* Willd., var. *laxiflora,* Vel. Lembet, in flower, 6-17, *Turner* 134.
*Sideritis montana,* L. Kato, in flower, 4-18, *Turner* 290; Ano, in flower, spring 1918, *Turner* 304.
Both specimens have smaller flowers than in the typical plant, but the difference is probably directly due to habitat.

**Origanum hirtum,** *Link.* (*O. heracleoticum*, L.?).
Stavros, in flower, 7-17, *Turner* 203.
*Distr.* Greece, Maced., Crete, Asia Minor.

*Scutellaria albida*, L. Lembet, in flower, 7-17, *Turner* 194.
*Ajuga Chamaepitys*, Schreb. (*A. Chamaepytis*, Ind. Kew.). Lembet, in flower, 5-17, *Turner* 120.
*Ajuga genevensis*, L. Ano, in flower, 4-18, *Turner* 311.
*Teucrium Polium*, L. Lembet, in flower, 6-17, *Turner* 151.
*Teucrium Chamaedrys*, L. Lembet, in flower, 6-17, *Turner* 162.

**Plantago Coronopus,** *L.*
Stavros, in flower, 9-17, *Turner* 250.
*Distr.* Cent. and S. Eur., N. Afr., Orient.
Balkans: Greece, Maced., Thrace, Bulg.

**Phytolacca americana,** *L.*
Stavros, in flower and fruit, 7-17, *Turner* 223, 224.
*Distr.* A native of N. Amer. now widely spread in the Medit. Region.
*Turner* 224 has a considerable amount of red colour in the flowers and inflorescence, but it has not been found possible to separate it from the typical plant by any morphological characters.

**Amarantus retroflexus,** *L.*
Stavros, in flower and fruit, 9-17, *Turner* 268.
*Distr.* Cent. and S. Eur., N. Afr., Orient, America.
Balkans: Greece, Maced., Bulg.

**Gomphrena globosa,** *L.*
Stavros, in flower, 9-17, *Turner* 252. "Picked up on the shore."
*Distr.* Native of the tropics.

**Chenopodium opulifolium,** *Schrad.*
Stavros, in flower, 8-17, *Turner* 235.
*Distr.* Cent. and S. Eur., N. Afr., Orient.
Balkans: Greece.

*Chenopodium Botrys*, L. Stavros, in fruit, 9-17, *Turner* 265.

**Chenopodium album,** *L.*
Stavros, in flower and fruit, 9-17, *Turner* 266, 267.
*Distr.* Cosmopolitan.
Balkans: General.

**Salsola Kali,** *L.*
Stavros, 8-17, *Turner* 238.
*Distr.* Nearly cosmopolitan.
Balkans: Greece, Maced., Bulg.

*Polygonum pulchellum*, Lois. $8\frac{1}{2}$ km. N. of Salonika, in flower, 7-17, *Turner* 196.

**Polygonum arenaria,** *W.K.*
Stavros, in flower, 1917, *Turner* 286; Kato, in flower, 4-18, *Turner* 289; Ano, in flower, 4-18, *Turner* 303.
*Distr.* S.E. Eur., Caucasus.
Balkans: Greece, Thrace, Bulg.

**Euphorbia Peplis,** *L.*
Stavros, in flower and fruit, 8-17, *Turner* 243.
*Distr.* W. and S. Eur., N. Afr., Orient.
Balkans: Greece, Maced., Bulg.

**Euphorbia falcata,** *L.*
Lembet, in flower and fruit, 6-17, *Turner* 145.
*Distr.* Cent. and S. Eur., N. Afr., Orient.
Balkans: Greece, Bulg.

**Ficus Carica,** *L.*
Lembet (young leaves), spring 1917, *Turner* 53.
*Distr.* S. Eur., N. Afr., Orient.
Balkans: General.

*Ulmus campestris,* L. Stavros, 9-17, *Turner* 269.

**Quercus Ilex,** *L.*
Stavros, 9-17, *Turner* 285.
*Distr.* S. Eur., N. Afr., Orient.
Balkans: Greece, Maced.

**Quercus Ilex,** *L.* var. **agrifolia,** *DC.*
Stavros, 9-17, *Turner* 277.
*Distr.* (of var.). Here and there with type.

**Quercus lanuginosa,** *Thuill.*
Stavros, 9-17, *Turner* 275.
*Distr.* S.E. Eur., Caucasus.
Balkans: Greece, Bulg.

*Cephalanthera ensifolia,* Rich. Ano-Krusones, in flower, 4-18, *Turner* 326.
*Ophrys cornuta,* Stev. Ano-Krusones, in flower, 4-18, *Turner* 316.
*Ophrys atrata,* Lindl. Ano-Krusones, in flower, 4-18, *Turner* 315.

**Orchis tridentata,** *Scop.*, var. **commutata,** *Reichb.*
Ano-Krusones, in flower, 4-18, *Turner* 328.
*Distr.* (of var.). S.E. Eur., Orient.
Balkans: Greece, Maced.

*Iris Reichenbachii,* Heuf. Lembet, in flower, 4-17, *Turner* 47.
*Romulea bulbocodium,* R. et S. Karaissi, in flower, 2-17, *Turner* 2.

**Romulea Linaresii,** *Parl.*
Ano, in flower, 4-18, *Turner* 333.
*Distr.* Corsica to Thrace.
Balkans: Greece, Thrace.

**Smilax aspera,** *L.* var. **mauritanica,** *Desf.*
Stavros, 9-17, *Turner* 273.
*Distr.* S. Eur., N. Afr., Orient.
Balkans: Greece, Maced.

**Ruscus aculeatus,** *L.*
Stavros, 9-17, *Turner* 274.
*Distr.* Cent. and S. Eur., N. Afr., Orient.
Balkans: Greece, Maced., Thrace, Bulg.

*Asparagus acutifolius,* L. Lembet, 4-17, *Turner* 42.

**Asparagus acutifolius,** *L.* var. **orientalis,** *Baker.*
Stavros, 9-17, *Turner* 272.
*Distr.* (of var.). Paros, Palestine.

*Allium margaritaceum,* S. et S. Lembet, in flower, 6-17, *Turner* 146.
*Muscari comosum,* Mill. Lembet, in flower, 4-17, *Turner* 46, 51.
*Muscari racemosum,* L. Lembet, in flower, 3-17, *Turner* 11.

**Hyacinthus orientalis,** *L.*
Cultivated by *H. Blanchard,* Esq., from a bulb collected in a ruined Bulgar village in Macedonia, in flower, 6-3-20.
*Distr.* Orient. In cultivation and as a garden escape in most of the southern parts of the Balkans.

*Ornithogalum umbellatum,* L. Ano-Krusones, in flower, 4-18, *Turner* 323.
*Ornithogalum fimbriatum,* Willd. Lembet, in flower, 4 and 5-17, *Turner* 39, 103.

**Gagea stenopetala,** *Reichb.* var. **rumelica,** *Vel.*
Karaissi, in flower, 2-17, *Turner* 1.
*Distr.* (of var.). S. Bulg.

**Colchicum latifolium,** *Sibth.*
Stavros, in flower, 9-17, *Turner* 261, 287.
*Distr.* Greece, Macedonia.

**Arum italicum,** *Mill.*
Lembet, in flower, 5-17, *Turner* 127.
*Distr.* S. Eur., N. Afr., Orient.
Balkans: Greece, Bulg.

**Cyperus fuscus,** *L.*
Stavros, in flower, 8-17, *Turner* 242.
*Distr.* Cent. and S. Eur., N. Afr., Orient.
Balkans: Greece, Maced., Bulg.

*Cynodon Dactylon,* Pers. Lembet, in flower, 5-17, *Turner* 106.
*Briza maxima,* L. Lembet, in flower, 5-17, *Turner* 105.

**Phacelurus digitatus,** *Griseb.*
Stavros, in flower, 8-17, *Turner* 244.
*Distr.* Thessaly, Maced., Thrace, Asia Minor.

# XXVII.—MACROZANONIA MACROCARPA.

R. A. Rolfe.

Two beautiful winged seeds have been sent to Kew for determination from the Botanic Gardens, Brisbane, by Mr. C. T. White, Government Botanist. One is from a sample obtained by Mr. M. J. Colclough in the Aru Islands, and it is said that they are often picked up on schooners' decks at sea, and when seen in the air have a butterfly-like appearance. The other is from specimens collected by the late Captain F. R. Barton, private secretary to the Lieut.-Governor of New Guinea. These were doubtfully referred to *Bignoniaceae* by the late Mr. F. M. Bailey, Government Botanist, though he remarked that "without further specimens it would only be conjecture to say to what plant they belong." Mr. White adds: "I have also seen the same thing in Papua (Mekoe District), but unfortunately failed to get specimens. The plant is said to be a large climber." The two seeds are identical, and are clearly Cucurbitaceous. They prove on comparison to belong to the plant described by Blume as long ago as 1825, from Javan materials, under the name of *Zanonia macrocarpa*, Blume, which has since been separated from *Zanonia* by Cogniaux, under the name of *Macrozanonia macrocarpa*. As it proves to be of wide distribution, though still very imperfectly known, the following account of its history should prove interesting.

The plant was originally very briefly described by Blume, in 1825, under the name of *Zanonia macrocarpa*, from fruiting materials found on Mt. Parang, Java. The author gave the native name as "Aroy Kitjubung," and created for it the new section, *Alsomitra*, Blume, which he distinguished from *Zanonia* proper by its hemispherical fruit and polyspermous cells. The flowers were not known.

In 1843 the plant appeared under the name of *Alsomitra macrocarpa*, Blume, a mistake for Roemer. The latter author established a genus *Alsomitra*, Blume (also a mistake), including in it *Zanonia* section *Alsomitra*, *Z. macrocarpa* (both wrongly attributed to De Candolle), and seven other species which are evidently not immediately allied to *Z. macrocarpa*. He did not define the genus in any way, and its heterogenous character was subsequently recognised by the authors of the Genera Plantarum, who excluded *Alsomitra macrocarpa*, Roem., as a foreign element, and gave to the remainder clear generic definition, an arrangement which has since been generally accepted.

In 1881 Cogniaux was able to give further details of *Z. macrocarpa*, including its fruit and seeds, though flowers were still lacking, and he then established the sectional name *Macrozanonia* for its reception, rightly pointing out that it was not *Zanonia* section *Alsomitra*, Blume. The character of section *Macrozanonia* was given as "Fructus maximus, hemisphaericus, loculis polyspermis. Semina ovata; ala ampla, tenuissime membranacea, diaphana, lateraliter valde dilatata," while of section *Euzanonia* he wrote, "Fructus parvus, cylindrico-clavatus, loculis 2-spermis. Semina oblonga; ala crassa, basi apiceque dilatata."

He also added the localities, Islands of Batjam, Borneo, Mt. Arfak, in Dutch New Guinea, and the Aru Islands, further materials having been collected by Zollinger, De Vriese, Korthals, and Beccari.

In 1893 Cogniaux gave to *Macrozanonia* the rank of a distinct genus, though he added that the flowers were still unknown, and it was not until thirteen years later that he was able to add these important details. The circumstance is thus described: " J'étais désireux de pouvoir étudier les fleurs du *Zanonia macrocarpa* qui jusqu'ici, à ma connaissance, n'existent encore dans aucun herbier européen. Au printemps dernier, ayant eu l'occasion d'être en rapport avec M. J. J. Smith, conservateur au Jardin botanique de Buitenzorg (Java), je lui exprimai l'ardent désir que j'avais de posséder des fleurs de cette espèce. Ma demande fut accueillie avec la plus grande bienveillance, et sur la fin de juillet, je reçus de M. le Dr. Treub, directeur du Département de l'Agriculture, à Java, une caisse contenant de beaux échantillons fleuris de la plante désirée, ainsi qu'un flacon des fleurs des deux sexes, à divers degrés développement." This material enabled the description of the genus to be completed.

Captain F. R. Barton, private secretary to the Lieut.-Governor of New Guinea, sent seeds of an unknown plant to Mr. F. M. Bailey in 1904 and described them as brown, surrounded by broad transparent wings, the whole giving a horizontal diameter of from 5 to 6 in. It is one of these seeds that has now been sent by Mr. White, and proves to belong to *Macrozanonia macrocarpa*.

In 1906, Mr. E. D. Merrill, of the Philippine Bureau of Science, described *Zanonia philippinensis*, Merrill, from the Lamao Lake district, Mindanao, remarking, " A species evidently related to the Malayan *Zanonia macrocarpa*, Blume, differing from the latter in its cordate leaves, and smaller seeds, which have much wider and somewhat longer wings than in Blume's species." It has since been collected in the Island of Negros, and there are specimens from both localities at Kew, but I am unable to separate them from the Malayan materials.

Lastly, we have the record of Miss L. Gibbs that in the Mt. Arfak district of New Guinea " *Zanonia macrocarpa* is the most conspicuous plant seen along the coast in the lower forest. It obliterates whole trees with dense walls of verdure, while the huge fallen fruits, rotting on the ground, are the most striking objects in the forest. The seeds, with transparent wings about 10 cm. across, often fill the air, lazily borne on the breeze, like great butterflies, for which, indeed, I took them at first in the distance."

The species appears to be widely diffused, from Java and Borneo, to Negros and Mindanao in the Philippines, the Aru Islands in the Moluccas, and both western and eastern New Guinea.

The following are the references:—

*Macrozanonia macrocarpa*, Cogn. in Bull. Herb. Boiss. i. p. 612 (1893); K. Schum. & Lauterb. Fl. Deutsch. Südsee, p. 589 (1901); Cogn. in Bull. Soc. Bot. Belg. xliii. p. 358 (1906).

*Zanonia macrocarpa*, Blume, Bijdr. p. 937 (1825); Ser. in DC.

Prodr. iii. p. 299 (1828); G. Don Gen. Syst. iii. p. 4 (1834); Miq. Fl. Ind. Batav. i. pt. 1, p. 683 (1855); Cogn. in DC Monogr. iii. p. 927 (1881); Warb. in Engl. Jahrb. xiii. p. 444 (1891); Gibbs, Dutch N.W. New Guinea, pp. 17, 51, 222 (1917).

*Alsomitra macrocarpa*, Roem. Synops. ii. p. 117 (1846).

*Bignoniaceae*, F. M. Bailey, in Proc. Roy. Soc. Queensl. xviii. p. 2 (1904).

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## XXVIII.—THE WEST AFRICAN OIL PALM.

(*Elaeis guineensis*, Jacq.).

J. H. Holland.

In the editorial paper on the West African Oil Palm (*K.B.* 1909, p. 47) special importance was attached to the cultivation and development of well marked varieties. The lines on which the experiments should be made were given, the keeping of careful records suggested and from the facts gathered up to that time it was considered clear that prolonged experimental work should be undertaken before any extensive sowings of the seed of a particular variety of the Oil Palm were made. Since that date the subject has been before the Agricultural Departments of the Gold Coast, Nigeria, Federated Malay States, Ceylon, Seychelles, etc. All the known varieties have been tested, more especially in West Africa, the "Soft-shelled nut" (forma *tenera*, Becc.) having been one of the most prominent, and great hopes have been centred in this form because of its convenience for cracking. So far, however, neither *tenera* nor any other variety or form appears to have been found constant in their characters on reproduction. The position was summarised in the *Bulletin* for 1918 (pp. 121–124) and the following particulars are to a large extent a continuation of the records there discussed.

In the Gold Coast Report on the Agricultural Department for 1918, it is stated that "the varieties again suffered badly from beetles and only very small crops of fruit were obtained, and that *(*a*) "Gamopeley"—trees 2, 4 and 6 gave 11 bunches, containing 2215 nuts weighing 50·11 lb., the fruits being similar to "Abetuntum" [fruit nearly spherical, pericarp black at the apex, red at the base, nut hard: see *K.B.* 1909, p. 40]. *(*b*) "Diwakakwaka"—the single tree was badly attacked by beetles and no fruits were gathered during the year. *(*c*) "Lisombe" [the soft-shelled palm, forma *tenera*, Becc.]—trees 1, 2 and 4 gave 14 bunches containing 3200 nuts, weighing 77·26 lb. No. 1 alone gave 9 bunches. The fruits are similar to "Abetuntum." (*d*) "Abefita" [fruit very large, pericarp reddish-white, occasionally streaked with black, nut hard: palm exceedingly scarce: (see *K.B.* l.c.): the white Oil Palm, var. *albescens*, Becc.]—trees 4 and 5 gave 5 bunches containing 654 nuts, weighing 10·8 lb.; one of them gave true nuts, the other resembled "Abepa" [fruit pointed at the apex, pericarp very thin and of a dark-reddish colour, a very hard thick nut (l.c. p. 39): the hard-shelled

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* (*a*), (*b*), (*c*) Cameroon varieties.

palm nut or var. *communis*, Chev., forma *dura*, Becc.]. (*e*) "Abetuntum"—trees 3 and 5 gave 16 bunches containing 3821 nuts, weighing 50·22 lb., they were all fairly true to type. (*f*) "Abobobe" [fruit medium size, similar in shape and colour to "Abetuntum," shell of the nut very thin and can easily be cracked with the teeth (see *K.B.* l.c. p. 40): the soft-shelled nut or thin-shelled variety: forma *tenera*, Becc.]—trees 1, 3 and 5 gave 12 bunches containing 1318 nuts weighing 21·32 lb. No. 5 gave true thin-shelled nuts. (*g*) "Abedam" [fruit in shape similar to "Abepa," pericarp yellowish-red, nut very hard, "the false or crazy oil-palm" widely distributed over the colony (l.c. p. 40), forma *fatua*, Becc.]—trees 2, 4 and 5 gave 11 bunches, containing 4472 nuts weighing 61·34 lb.: none of them appear true to type."

The above refers to the Agricultural Station at Aburi and the following report (for 1918) is that for the sub-station at Kibbi (records for 1916, *K.B.* 1918, p. 121)—"The various palms were planted in 1912 and as most of them are now coming into bearing they were numbered in August so that the yield of each palm may be ascertained. In future years therefore the individual yields of each palm will be available and a complete survey of the fruits will be made. The following are the aggregate yields for each variety as planted without discriminating:—"Abetuntum," 22 bunches weighing 95 lb. and 48 lb. clean fruits, average clean fruits per bunch 22 lb. "Abobobe," 67 bunches weighing 374 lb. and 203 lb. clean fruits, average clean fruits per bunch 3 lb. "Abepa," 64 bunches weighing 405 lb. and 225½ lb. clean fruits, average clean fruits per bunch 3·5 lb. Mixed varieties gave 144 bunches weighing 1152 lb. and 652 lb. clean fruits, average clean fruits per bunch 4·5 lb. These yields are not much better than in the previous year."

Apart from the cultivation of any special variety on the Gold Coast, it has been found that the cleaning and thinning for a 5-acre plot—357 naturally grown trees in bearing—and the tilling of the soil for other crops amongst odd palm oil trees left standing at the Peki Blengo Station has resulted in a considerable increase in yield (Report Dept. Agric. 1916, p. 53: *K.B.* 1918, p. 121).

In reference to the cultivation in the Seychelles for 1918 (records for 1916, *K.B.* l.c. p. 122) the Curator of the Botanic Station reports:—"Palm oil seeds of the soft kernel varieties were received from the Director of Agriculture, S. Nigeria, during the year (December). Two parcel posts reached Seychelles after being exactly 4 months in transit. Upon the recommendation of Sir D. Prain small consignments will be tested at first as regards the germinating power of the seeds before larger consignments are secured. The varieties already established in the Colony continue to do well. The eight trees grown at the Botanic Station in poor laterite and obtained from soft-shelled seeds from the Cameroons in 1912 have all flowered. Ripe nuts were obtained from four trees, Nos. 1, 3, 4, 5. Of these trees two turned out true to type, Nos. 3 and 5. Nos. 1 and 4 produced hard-shelled nuts. At the 'Palms' (private estate) out of seven plants of

the soft-shelled variety grown in good alluvial soil, four fruited during the year, Nos. 2, 4, 6 and 12; of these only one produced nuts true to type, No. 6. It is a fine tree, which fruited abundantly this year, four ripe bunches having being secured in November and December. The proportion of kernel to nuts (dry) is as high as 53 per cent. In the hard shelled types the proportion is 13 per cent. In another field set out in 1915 near the hospital bridge there are at present thirteen palms growing in two rows out of which eleven are just coming into bearing, and it remains to be seen early in 1919 how many of these plants from soft-shelled seeds will come true to type. I am indebted to the proprietor of the 'Palms' who in 1918 allowed me to fence in tree No. 6 from which seeds are now being secured and sown. It has been decided on Government land to remove the trees which produce hard-shelled nuts so as to avoid cross pollination of the more valuable soft-shelled plants. It is, however, as yet too early to adopt a general policy as regards this question of selection, because many of the hard-shelled trees grown from soft-shelled seeds seem to produce hitherto larger bunches of fruits yielding larger kernels and more pericarp than the true to type trees. For this reason the whole row of trees at the 'Palms' will be left standing although more than half of them have already been shown to produce hard-shelled nuts. The plants grown from seed obtained from Lagos in 1913 have not yet come into bearing."

The following records from Southern Nigeria are taken from the Annual Reports of the Director of Agriculture for 1917, pp. 8–9 and 1918, p. 14. In a connected form for this Colony they are the first to be published in the *Bulletin* and afford evidence that is particularly valuable as coming from the land of our most important trade source of palm-oil and kernels. As on the Gold Coast the experiments in the cultivation of marked varieties is wisely combined with an enquiry as to the effect of cultivation on wild trees in enclosed areas.

In 1911 seeds of the known varieties of the oil-palm were collected and propagated at all the Agricultural Stations, as it is desirable to ascertain whether any or all of these varieties breed true and which is the most profitable variety to cultivate. The seedlings raised were planted out in small plots and some of them commenced to bear fruit towards the end of 1916. As no other officer was available for this work, the Mycologist commenced at Moor Plantation a preliminary investigation of the botanical and economic characters of the oil palm.

The fruits produced by the three plots of young palms were examined, but they were so small that they only yielded a negligible quantity of pericarp oil and kernels. In the thin shell variety, plot not a single fruit with a thin shell has yet been harvested; all the fruits have typically thick shells. The variety in the third plot is that known to the Ibadan people as "Ope Ifa," it is not to be confused with the "Ope Ifa" or "King Palm" of the Lagos people, it is a thick shell variety, but the kernels occasionally have four instead of three eyes, which is characteristic of the thick shell variety. In the thin shell variety

one and frequently two of the eyes are aborted, occasionally fruits were found to consist of a mass of fibre and without a trace of a nut. A plot planted with palms raised from mixed, unselected nuts, has only one palm which yields nuts with thin shells. Both this plot and the "Ope Ifa" plot has a palm which exhibits freak characters. These small plantings have clearly demonstrated that the oil palm is not a "fixed" species.

Fruits were regularly harvested from the one-acre enclosure of wild palms; this enclosure has 44 fruit-bearing palms, only one of which is the thin-shell variety. It is interesting to note that fruit was collected during each month of the year and on 18 different occasions. The total number of bunches collected was 290, which yielded 3652 lb. of fruit. The average yield per tree was thus 6·6 bunches. The average weight of fruit per bunch was 12·25 lb. The weight of the bunches has no value, for this varies enormously in accordance with climatic conditions; during wet weather they absorb a large amount of moisture.

The oil was extracted from the pericarp by the method commonly practised in the Western Provinces, and which is reported to produce what is known commercially as "soft" oil. Briefly described the procedure is as follows:—The fruits are separated from the bunch with the aid of a cutlass, and boiled with water in an iron pot until the pericarp becomes soft. They are then turned into a wooden mortar and beaten with wooden pestles to separate the pericarp from the nuts. The mixture of nuts, oil and fibre which results is put into a circular pit which has its surface lined with hardened clay. Here it is trodden on until any fibrous matter adhering to the nuts is removed. The nuts are picked out, and the fibrous mass remaining is hand squeezed; the fibre being discarded. The oily matter which rises to the surface is boiled to evaporate any water present, after which the oil is ready for market. The method is essentially crude; the amount of oil extracted varies from 5·5 to 7 per cent. of the total weight of the fruits; by means of solvents it is possible to extract oil equivalent to more than 10 per cent. of the weight of the fruits.

Experimental extractions from the small quantities of thin shell fruits available gave from 7·5 to 12·5 per cent. of the total weight as pericarp oil. About 600 thick shell kernels go to the pound, as against 1400 thin shell kernels.

From a large control extraction made under careful supervision the following results were recorded—

| | |
|---|---|
| Total number of bunches harvested ... | 136 |
| Gross weight of bunches ... ... ... | 2,130 lb. |
| Weight of fruits ... ... ... ... | 1,331 lb. |
| Average weight of fruits per bunch ... | 9·78 lb. |
| Total yield of pericarp oil ... ... ... | 10·0 galls. |
| Equivalent yield per 100 lb. of fruits | 120·2 fluid oz. of oil [one gall. = 160 fl. oz.] |
| Total weight of oil extracted ... | 95 lb., i.e. *9·5 lb. to gall. |
| Total weight of kernels ... ... ... | 181 lb. |

The weight of oil extracted equals 7·14 per cent. of the fruits

* Farquhar & Thompson ("Oil Palm," p. 23) state that one imperial gallon of cold palm oil weighs 8·2 lb.

treated. From these results it is calculated that the acre of wild palms referred to above yielded 261 lb. of pericarp oil and 497 lb. of kernels.

In 1918 the Director of Agriculture reports: "These investigations were proceeded with as far as circumstances permitted. The yield of fruits, pericarp oil and kernels from the various plots is shown below. The oil was again expressed by the primitive native method, as our efforts to procure an oil press have so far been unsuccessful."

| | 1 acre enclosure of wild palms. 1913 | 1 acre of palms planted in 20′×20′. |
|---|---|---|
| Number of collections | 15 | 12 |
| Number of bunches collected | 265 | 99 |
| Weight of bunches, lb. | 5671 | 2369·5 |
| Weight of fruits in bunches, lb. | 3370 | 1476 |
| Weight of fruits in bunches, % | 59·4 | 62·3 |
| Weight of nuts obtained, lb. | 1871 | 803·1 |
| Weight of nuts in fruits, % | 55·5 | 55·1 |
| Weight of kernels obtained, lb. | 396·3 | 175·4 |
| Weight of kernels in nuts, % | 21·2 | 21·8 |
| Weight of oil obtained, lb. | 187·8 | 79·67 |
| Weight of pericarp oil in fruits, % | 5·6 | 5·4 |

A sample of nuts of the "Abepa" variety of the Gold Coast was received at the Museum from Ceylon in June, 1919. In reference to this the Director of Agriculture (letter to Director, Kew, dated 29th May, 1919) states: "Seed of this variety of oil palm was secured by this Department in June, 1915, from the Department of Agriculture, Gold Coast. From the plants raised from this consignment, 3 acres of oil-palms were planted 22 ft. by 22 ft. in November, 1915. The plot has been regularly cultivated with disc harrows. Cow-peas (*Vigna Catiang*) and other leguminous crops were inter-sown and ploughed in from time to time. The Experiment Station is situated in the Dry Zone of the Colony, rain rarely falling in any appreciable quantity between May and October. During the dry season the palms have been under irrigation. The average rainfall at the Experiment Station (Anuradhapura) is 68·66 in. In February, 1918, the palms flowered for the first time, viz., at the age of 2 years and 3 months and in October, 1918, the first collection of fruit was made, when 46 lb. was secured. The young palms are looking extremely healthy and vigorous."

It may be of interest to note that in 1897 a firm of nurserymen in Ceylon were prepared to supply seeds of *Elaeis guineensis* at 10s. per 100 (Queensland Agric. Journ. i. 1897, p. 461).

The cultivation in the Dutch East Indian Possessions (*K.B.* 1918, p. 124) is being rapidly extended. The Director of the Algemeen Proefstation Avros, reports (letter to Director, dated Medan, 27th May, 1919) that in 1918 the total of plantations where the "Oil-palm" is cultivated numbers 22, of which 15 are situated on the East Coast of Sumatra, 6 in Attjeh and one in the western part of Borneo, the total area under cultivation being 2303 hectares with a productive area of 982 hectares. "West

Africa," in the issue for March 27th, 1920, records that "at the beginning of 1919 there were in Eastern Sumatra, 5188 hectares planted with 556,162 trees, of which 306,381 (covering 2723 hectares) were in full production," and "Handelsvereeniging, Amsterdam," mentions (letter to Director, dated Amsterdam, April 10th, 1919) that in Sumatra there were 3730 hectares of Oil-palms under cultivation in properly organised plantations.

The following particulars have recently been received by the Director from Mr. R. Swainson Hall, Cabinda, Portuguese Congo, a region which hitherto has not contributed to the fund of information that has been published in the *Bulletin* from time to time. The pericarp, endocarp and endosperm percentages are based upon the weight of one fruit, which was the weight obtained from an average of several typical fruits from each variety. The percentages of oil and kernels are based upon the weight of bunch when freshly cut. It is proposed to undertake experiments in the pollination of the thin-shelled variety—"Bissombe" of the Portuguese Congo and the results will be awaited with much interest.

The varieties of the Oil-Palm, so far noted existing in the Portuguese Congo, together with their native names, are as follows:—

(1) *Elaeis guineensis*, Jacq. var. *microsperma*, Welw. (Fl. Trop. Africa, viii. (1902) x); forma *tenera*, Becc.. or *Kew Bull.* 1914, No. 8, 287, var. *communis*, Chev., forma *tenera*, Becc. Thin shell which can easily be cracked with the teeth. Fruits large and oblong, very fleshy pericarp, soft thin shell, weight of one average fruit, 14·95 grams.

Analysis.—Fleshy pericarp forms 80·6 % of fruit.
,, endocarp ,, 10·7 % ,,
,, endosperm ,, 8·7 % ,,
Oil ... ... ,, 12·25 % ,,
Kernels ... ,, 10·2 % ,,

The native name in the Portuguese Congo for this variety is "Bissombe." This palm does not appear to be very plentiful here.

(2) *Elaeis guineensis*, Jacq., var. *macrosperma*, Welw. (Aponts. p. 584) or var. *communis*, Chev. *Kew Bull.* 1914, p. 286, forma *dura*, Becc. Hard thick shell. Common variety palm. Weight of one average fruit, 16·1 grams.

Analysis.—Fleshy pericarp forms 54·3 % of fruit.
,, endocarp ,, 37·0 % ,,
,, endosperm ,, 8·7 % ,,
Oil ... ... ,, 9·07 % ,,
Kernels ... ,, 7·9 % ,,

Native name, "Peepiti." This palm is plentiful.

(3) *Elaeis guineensis*, Jacq. var. *repanda*, Becc. Chev. (l.c. p. 61) a variety with green tinted fruits, when young and unripe all green, but when ripe green at tips only. Weight of one average fruit, 18·2 grams.

Analysis.—Fleshy pericarp forms 50·0 % of fruit.
,, endocarp ,, 38·0 % ,,
,, endosperm ,, 12·0 % ,,
Oil ... ... ,, 5·25 % ,,
Kernels ... ,, 6·09 % ,,

Native name, "Matuundaby." This palm appears to be very rare here, the natives do not use the oil, as it is said to be a "fetish."

Another instance recently brought into notice of uncertainty in reproduction lies in the variety with the fleshy perianth, known as "Ayara Mbana" in Old Calabar, *"Agode" or "Klude" of Togoland (*Elaeis guineensis*, var. C. H. Wright in *K.B.* 1913, p. 92, with fig. of fruit, and 1919, p. 238. *E.g.* sub-sp. *nigrescens* var. *Poissonii*, A. Chev. *E. Poissonii*, Annet). From a sowing made by Dr. Gruner (Togoland) in 1905 of 61 seeds of "Klude," 51 palms were raised which bore "Klude" fruits and 10 palms which bore fruits of "Dento" or the ordinary variety.

It may be early to generalise or to draw any conclusions as to the prospects under cultivation. Everything, however, at the moment, tends to the advisability that not only experiments in pollination and development of particular varieties on the lines indicated, but that selection on lines similar to those recommended for the "Coco-nut" (see *K.B.* 1915, pp. 72–76) should also be advanced in every possible way. If either of these palms could be raised from suckers in the same way as the "Date Palm" there would be quite a different story to tell in the fixing of varieties and no shadow of disappointment when the time came to gather the crops.

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## XXIX.—DECADES KEWENSES

PLANTARUM NOVARUM IN HERBARIO HORTI REGII CONSERVATARUM.

### DECAS XCVIII.

971. **Malus toringoides,** *Hughes* [Rosaceae-Pomeae]; affinis *M. transitoriae*, Schneider, sed foliis majoribus ad 8 cm. longis minus profunde lobatis interdum indivisis elliptico-oblongis crenato-serratis vel lobulatis, floribus et fructibus multo majoribus, calycis tubo more generis.

*Frutex* vel *arbor* 3–8 m. alta. *Rami* patentes, leviter penduli, infimi prope terram orti, purpureo- vel brunneo-fusci, praeter novellos araneoso-villosos glabri vel glabrescentes; gemmae parvae, ovatae, acutae, sparse lanuginosae. *Folia* decidua, ad 8 cm. longa, profunde lobata, ambitu ovata vel ovato-elliptica, crenato-serrata, rarius indivisa et tunc elliptico-oblonga, basi attenuata, supra viridia, subtus pallidiora, ad nervos pubescentia, caeterum glabrescentia; petioli supra leviter canaliculati, 1–3 cm. longi, araneoso-villosi. *Flores* in fasciculis vel corymbis subsessilibus 3–6-floris. *Calycis* lobi elongato-triangulares, acuminati, circiter 4 mm. longi, basi 2 mm. lati, tubo breviores, utrinque ut tubus dense tomentosi. *Petala* late ovalia, obtusa, parce subcrenulata, breviter unguiculata, 0·9–1 cm. longa,

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* "Agode" or "Klude" was attributed in *Kew Bulletin*, 1914, p. 288, to var. *idolatrica*. Becc. because it had been described as the "Sacred Palm" of Togoland (*K.B.* 1909, p. 43); but in view of Mr. Wright's note (*K.B.* 1919, p. 238) there seems to be more than one "fetish" palm in West Africa.

3–3·5 mm. lata, intus apice sparse pubescentia. *Stamina* circiter 20, petalis quarta parte breviora. *Styli* 3, staminibus superati, ad vel supra medium connati, glabri. *Ovula* in quoque loculo 2-nata, subcollateralia. *Fructus* maturus globosus vel obovatus, basi leviter attenuatus, apice depressus, cicatrice annuliformi calycis decidui notatus, 1–1·4 cm. diametro, flavus vel in latere ad solem spectante coccineus. *Semina* triangulari-obovoidea, 7–8 mm. longa, 3 mm. lata, pallida. *M. transitoria*, Schneider, var. *toringoides*, Rehd. in Sargent, Pl. Wilson. ii, 286; *Pyrus transitoria* var. *toringoides*, Osborn in Garden, Nov. 1, 1919, 522, with fig. of fruit.

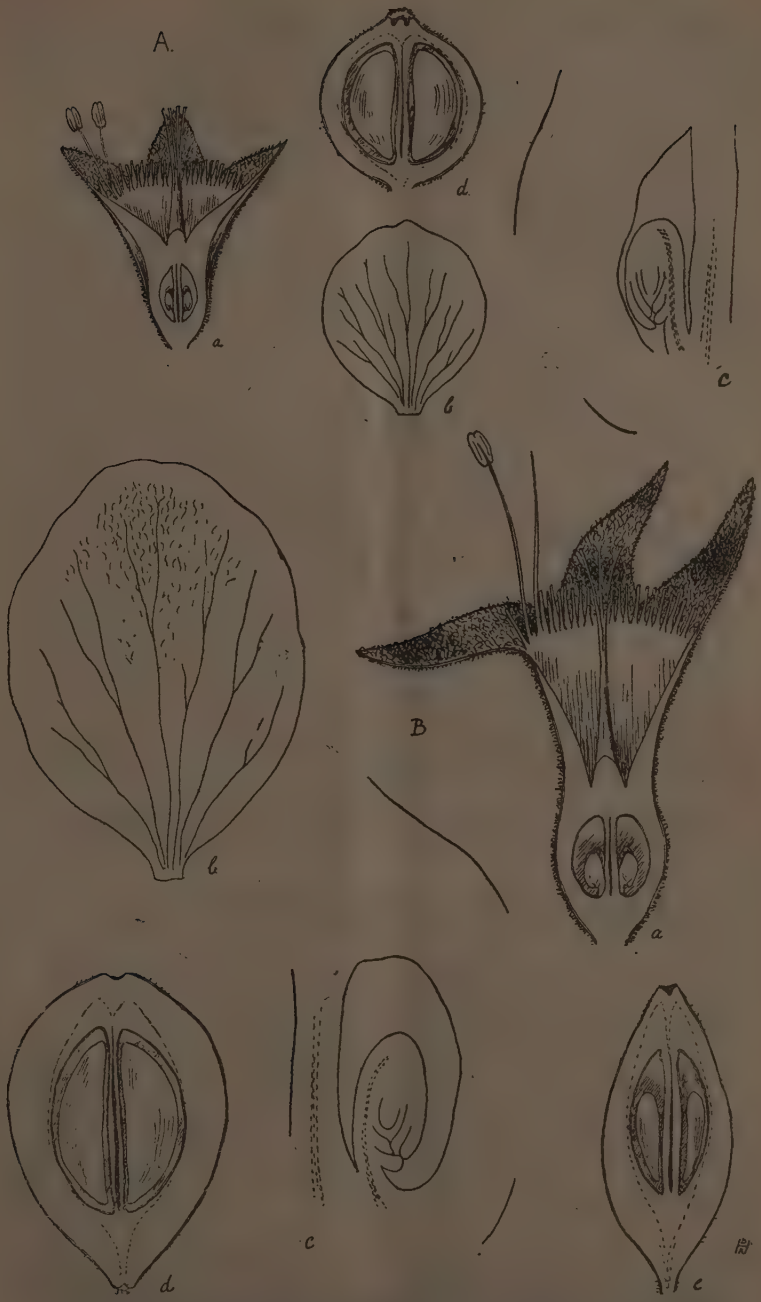
Western Szech'uan. West of Tachien-lu; 3300–3600 m., October, 1908, *Wilson* 1285; near Tongolo, West of Tachien-lu, 3000–3600 m. June to October, 1904, *Wilson* 3494, and Seed No. 1730.

Rehder in Sargent, Pl. Wilson. ii, 286, says: "This plant looks quite distinct from typical *M. transitoria* with its larger, partly entire leaves and larger fruit, and may turn out to be a distinct species, but as long as we do not know the mature fruits of the type and the flowers of this variety, we must rely on the difference in the leaves which are not sufficient for specific separation, as intergradations seem to exist." Flowering and fruiting specimens from Wilson's collection and fresh material from a plant grown at Kew (*Wilson*, seed no. 1730) being now available, it is quite evident that Rehder's suggestion of *M. transitoria* var. *toringoides* being a distinct species is correct.

In examining *M. transitoria*, Schneider, a peculiar condition has been observed in the structure of the receptacle. It consists in the separation of an outer portion extending from the calyx lobes to the base of the receptacle so that a cavity is formed between it and the remaining inner parts. The outer portion consists of the epidermis and the parenchyma immediately beneath as far as it contains chlorophyll. It is probably owing to some differentiation in the character of the cell-walls of the zone in question that the separation takes place. It becomes of course more manifest in the dried state. Whether this is a normal process which is eventually obliterated during maturation cannot be decided from the material available. The fruits at hand show at any rate no traces of a temporary disconnection of the chlorophyll bearing layer from the remainder of the fruit and the peculiarity described can therefore in the present state of our knowledge not be used as a diagnostic character, nor does it seem to throw any light on the problem of the morphological nature of the receptacle of *Pomaceae*.

972. **Leptodermis Parkeri,** *Dunn* [Rubiaceae-Paederieae] a *L. lanceolata*, Wall., nervis foliorum 4–5-paribus, floribus 2 cm. longis extus puberulis, seminis testa adnata distincta.

*Frutex* mediocris, praeter flores glaber. *Folia* sessilia, lanceolata, apice basique acuminata, 2–3 cm. longa, papyracea, nervis lateralibus 4 (–5) paribus infra vix prominulis. *Flores* praecoces, in ramulorum apicibus saepius terni, sessiles, basi bracteis binis involucralibus coriaceis apiculatis arcte cincti. *Calyx* ovoideus,




A. *M. transitoria*, Schneider; B. *M. toringoides*, Hughes; *a*, longitudinal section of the receptacle, 6×; *b*, petal, 6×; *c*, longitudinal section of an ovule, 30×; *d*, mature fruit, 3×; *e*, immature fruit, 3×.

5-lobus, lobis ovatis obtusis breviter fimbriatis. *Corolla* delabens alba (haud rubescens), infundibuliformis, extus puberula, 1·9 cm. longa, tubo et fauce introrsum pilosis, limbo 5-loba 1·2 cm. lato, lobis ovatis. *Stamina* 4, medio tubi inserta, inclusa. *Stylus* filiformis, apice 2–3 (–5)-fidus, stamina subaequans. *Ovarium* 5-loculare, loculis 1-ovulatis, ovulis anatropis erectis. *Fructus* obovatus, calyce discoque coronatus, siccus, loculicide 5-valvis; epicarpium a calyce solutum, pergamaceum; endocarpium fibrosum, semini arcte adnatum.

Punjab Himalaya. Chamba State: in forest undergrowth at Ilndhu Kothi; Belj valley at 7000 feet, 21.6.1919; Kainthli Reserve, Dalhousie Range at 6500 feet, 22.11.1919. *R. N. Parker.* Mr. Drummond tells me that it is frequent in and about the station of Dalhousie.

973. **Strobilanthes aborensis,** *Dunn* [Acanthaceae-Ruellieae] a *S. secundo,* T. Anders., foliis acuminatis basi rotundatis distat.

*Caules* 2 m. alti, inferne glabri; rami, ut pedunculi et calyces, breviter glanduloso-puberuli, nodis incrassatis. *Folia* lanceolata, acuminata, basi rotundata, obscure crenata, sessilia, 6–14 cm. longa, cystolithis punctiformibus tecta, glabra, venis 6–7 subtus prominulis. *Flores* laxe paniculati, in paria opposita sessilia dispositi; bracteae ovatae, 6 mm. longae. *Calyx* fere ad basin fissus, laciniis linearibus acutis. *Corolla* pallide lilacina, praeter pilos paucos albos internos glabra, tubulosa, 3·5 cm. longa, basi 2–3 mm. lata, supra medium inflata 1 cm. lata; lobi 5, rotundati, 4 mm. longi. *Stamina* 4. *Ovarium,* 4-ovulatum. *Capsula* oblanceolata, 1·5 cm. longa. *Semina* 4, rugulosa, glabra.

Eastern Himalaya. Outer Abor Hills: Makum; 140 m., also plentiful at Sadiya, Kobo, Rotung, Rengging and Yambung Flowers in November. *Burkill* 35757.

974. **Strobilanthes Burkilli,** *Dunn* [Acanthaceae-Ruellieae] a *S. geniculato,* C. B. Clarke, bracteis ante anthesin caducis distat.

*Frutex* parvus, praeter flores glaber, ramis crebre geniculatis. *Folia* superiora oblongo-lanceolata, acuminata, basi obtusa, obliqua, 6–9 cm. longa, breviter dentato-serrata, subsessilia, cystolithis linearibus tecta, venis 6-paribus infra prominulis. *Flores* 1–4-ni, capitata. *Capitula* graciliter pedunculata, bracteis lanceolatis 1 cm. longis membranaceis glabris ante anthesin caducis cicatrices parvas conspicuas relinquentibus; pedunculi 2–5 cm. longi. *Calyx* ad basin fissus, laciniis linearibus 7 mm. longis ut capsulis breviter glanduloso-pubescentibus. *Corolla* tubulosa, 3–4 cm. longa, basi 2–3 mm. diametro saepe paulo torta, supra medium inflata, 1 cm. lata, cucullata, pallide violacea; lobi 5, rotundati, 2–3 mm. longi. *Stamina* 4. *Ovarium* 4-ovulatum. *Capsula* oblanceolata, 1·3 cm. longa. *Semina* 2, rugulosa, glabra.

Eastern Himalaya. Outer Abor Hills; between Kobo and Pasighat. Flowers in December. *Burkill* 37107.

Mr. Burkill states that this species is found on the gravels of the plains and only just reaches the hills at the place indicated.

The description of the flowers is drawn up largely from his notes made on the spot at the time of collection.

975. **Strobilanthes tenax,** *Dunn* [Acanthaceae-Ruellieae] a *S. secundo*, T. Anders., paniculis glutinosis foliisque acute serratis distat.

*Caules* supra ut paniculi calyces et capsulae glanduloso-hirti, infra glabri. *Folia* lanceolata, acuminata, basi acuta, 8–10 cm. longa, crebre acute serrata, inferiora breviter petiolata, suprema sessilia, glabra, cystolithis linearibus tecta, venis 6-paribus infra prominulis. *Flores* laxe paniculati, in paria opposita sessilia dispositi; bracteae parvae, lineares, foliaceae, persistentes. *Calyx* ad basin fissus, 1 cm. longus, laciniis linearibus acutis. *Corolla* tubulosa, 3 cm. longa, basi 3–4 mm. diametro, supra medium inflata, 1 cm. lata; lobi 5, rotundati, patentes, 1–2 mm. longi. *Stamina* 4. *Ovarium* 4-ovulatum. *Capsula* oblanceolata, 1·5 cm. longa. *Semina* 2.

Eastern Himalaya. Outer Abor Hills: Kobo; 140 m. Flowers in March. *Burkill* 36785.

976. **Elatostema arcuans,** *Dunn* [Urticaceae-Procrideae] ab *E. platyphyllo*, Wedd., foliis membranaceis distans.

*Herba* magna, glabra, dioica. *Caules* multi, aggregati, carnosi, virides, striati, arcuantes, apice horizontales. *Folia* alterna, oblanceolata, acuminata, basi obliqua, obtusa vel acuta, parte superiore dentato-serrata, membranacea, cystolithis brevibus tecta, 15–25 cm. longa; stipulae lineari-lanceolatae, deciduae. *Capitula* ♀ (solum visa) fere sessillia, axillaria, hemisphaerica, paulo lobata, 1–2 cm. diametro. *Flores* numerosissimi, virides, breviter pedicellati. *Perigonium* 4-phyllum; segmenta ovata, obtusa, membranacea. *Achaenium* erectum, ovale, striatum, 0·5 mm. longum, perigonium patens bis excedens.

Eastern Himalaya. Outer Abor Hills: growing by water courses near Rotung; 450 m., flowering in December. *Burkill* 37365.

977. **Elatostema imbricans,** *Dunn* [Urticaceae-Procrideae] ab *E. surculoso*, Wight foliis oblongis regulariter imbricatis distat.

*Herba* parva, glabra. *Caulis* erectus, saepe ramosus, basi radicans, minute brunneo-furfuraceus. *Folia* alterna, imbricata, sessilia, oblonga, apice serraturis 5 prorsum directis notata, basi oblique cordata, 2–2·5 cm. longa, 6–7 mm. lata, trinervia, cystolithis linearibus crebre tecta et dense marginata. *Capitula* ♂ (solum visa) axillaria, sessilia, 3 mm. diametro; bracteae lineari-lanceolatae, scariosae, supra capitula et secus folia subtendentia arcuatae. *Flores* 2–4-ni, subsessiles, 1–2 mm. diametro involucro 4–5-phyllo inclusi; bracteae ovatae, 1–1·5 mm. longae, viridi-costatae. *Perianthii* segmenta 4, hyalina, ovata. *Stamina* 4, inflexa.

Eastern Himalaya. Outer Abor Hills: on the summit of Bapu; 2100 m., and on a "razor edge" ridge dividing the Lalik from the Serpo at 1700 m., in both cases on rocks where the ground is dry and the air very damp. *Burkill* 36364, 36938.

978. **Elatostema MacIntyrei,** *Dunn* [Urticaceae-Procrideae] ab *E. sesquifolio,* Hassk., foliis crenato-serratis, receptaculisque pedicellatis aggregatis distans.

*Frutex* parvus, praeter novellos glabrus, dioicus. *Ramuli* ut paginae foliorum superiores et involucri bracteae cystolithis linearibus dense tecti, striati. *Folia* alterna, oblique ovato-caudata, basi obtusa, 10–14 cm. longa, 4–5 cm. lata, parte superiore crenato-serrata, chartacea; petioli 0·5–1 cm. longi; stipulae triangulares, caudatae, basi latae, 1–2 cm. longae, deciduae. *Capitula* ♂ (solum visa) axillaria, 8–10-na, 6–8-flora, 1–2 mm. diametro; bracteae cucullatae, dorso calloso-gibbosae; pedunculi 3–5 mm. longi. *Flores* subsessiles, 1 mm. diametro. *Perigonii* segmenta 4, ovata, paulo cucullata. *Stamina* 4.

Eastern Himalaya. Outer Abor Hills; Rengging. Flowers in February. *Burkill* 36734.

At Mr. Burkill's request this species is dedicated to Major-General Donald Charles Frederick MacIntyre, C.B., Indian Army (Retired List), who will be pleasantly remembered by those who took part in the expedition on which the plant was collected.

979. **Andrachne emicans,** *Dunn* [Euphorbiaceae-Phyllantheae] ab *A. Clarkei,* Hook. f., foliis longe petiolatis, floribus fasciculatis differt.

*Frutex* parvus, glaber, ramos novellos steriles erectos ad 3 m. altos emittens, corpusculis clavatis in axillis aggregatis. *Folia* lanceolata, apice acuminata, basi acuta, 6–9 cm. longa, fusce virentia; nervi laterales, 8–9-pares; petioli graciles, 1–2 cm. longi. *Flores* ♀ (solum visi) axillares, 2–4-ni; pedicelli graciles, 0·9–1·1 cm. longi. *Sepala* 5, ovalia, obtusa, herbacea, 2 mm. longa. *Glandulae disci* cum sepalis alternae, ovatae, profunde bilobae, 0·5 mm. longae, membranaceae. *Ovarium* triloculare, 6-ovulatum. *Styli* 4–6, 0·5 mm. longi. *Capsula* depresse globosa, 0·5–0·6 mm. diametro. *Semina* 6, angulata, 1·5 mm. longa.

Eastern Himalaya. Outer Abor Hills: Kobo; river bank, fruiting in December. *Burkill* 35955, 37068, 37390.

The young shoots springing up to a height of 10 feet make this a notable plant in the jungle.

980. **Smithiella,** *Dunn* [Urticaceae-Procrideae] ab *Achudemia,* Bl., inflorescentia spicata unilaterali differt.

*Flores* dioici; ♀ minuti, in uno latere spicae longae gracilis liguliformis cum sterilibus glomerati. *Perianthium* 5-partitum, segmentis fere aequalibus. *Staminodia* 5, minuta, globosa, segmentis opposita. *Ovarium* angustum; stigma sessile, fasciculo pilorum radiantium formatum; ovulum e basi erectum. *Achaenium* erectum, compressum, perianthio persistente patente suffultum; pericarpium chartaceum. *Semen* erectum, testa membranacea; albumen tenue; cotyledones late ovati.

Herbae repentes. Folia opposita, petiolata, saepius aequalia, dentata, 3-nervia; stipulae intrapetiolares, deciduae. Spicae terminales.

**S. myriantha,** *Dunn*, species unica.

*Herba* viridissima, repens. *Caules* ascendentes, 30–50 cm. longi, basi radicantes. *Folia* late ovalia, apice breviter acuminata, basi obtusa, serrato-dentata, 13–15 cm. longa, 6–10 cm. lata, saepe aequilateralia, glandulas hydathodas in serraturis et alibi ferentia, cystolithis linearibus crebre conspersa, subglabra; petioli 2–5 cm. longi. *Spicae* ♀ 1–2-nae, 6–10 cm. longae; pedunculi aequilongi. *Perianthii* segmenta anguste ovata, 0·7 mm. longa, pilis 1–3 albis conspicuis coronata, ovarium includentia. *Achenium lenticulare*, 1·5 mm. diametro. *Flores steriles* lineares, 1 mm. longi, apice truncati. *Flores* ♂ ignoti.

*Smithiella.*—Fig. 1, part of plant; 2, stipule; 3, part of leaf; 4, inflorescence; 5, bud; 6, bud in section; 7, fruit; 8, part of fruit open; 9, section of seed.

Eastern Himalaya. Outer Abor Hills: on the sunless side of the Dihong Gorge in dark and very damp places below Rotung at 300 m., in similar situations near Puak at the same elevation and a little higher on the north of the Sidi river. Flowers in December and January. *Burkill* 36076, 37383, 37636.

This remarkable herb can easily be recognised as allied to *Procris*, *Achudemia* and *Elatostema*, even in the absence of male flowers, by its habit and floral characters, but the crowding of minute female flowers on to one side of a slender terminal spike was previously unknown in that group and finds counterparts among the *Urticaceae* only, in such genera as the tropical American Myriocarpas and the Dorstenias of America and Africa. The discoverer noted that the leaves averaged 70 square cm. in area and that they were always covered with drops of water (which had doubtless exuded from the conspicuous water glands).

The genus is respectfully dedicated to Miss Matilda Smith, and the specific name of the first species not inappropriately refers to its innumerable flowers as well as to the very large number of beautiful drawings and paintings of flowers with which Miss Smith has for so many years decorated the *Botanical Magazine*, the *Icones Plantarum* and the *Kew Bulletin*.

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## XXX.—ADDITIONS TO THE WILD FAUNA AND FLORA OF THE ROYAL BOTANIC GARDENS, KEW: XV.

The following additions to the wild fauna and flora have been recorded during recent years. The list of insects belonging to the *Aphididae*, *Psyllidae* and *Aleurodidae* has been drawn up by Mr. F. Laing, of the British Museum (Natural History) from observations made by him in the Gardens in 1914, 1915, and 1919. Mr. Laing remarks that further collecting will, no doubt, reveal many more species, especially amongst the *Aleurodidae* and *Psyllidae*, the present numbers of which are very small when we take into consideration the varied flora of the Gardens. A more up-to-date classification, he adds, might have been adopted in the *Aphididae*, but the classification of this group is in such a chaotic condition that it has been thought better to be conservative rather than use many of the genera which future work may show will not stand.

### Fauna.

COLEOPTERA.

**Myrrha octodecimguttata,** *L.* On *Urtica dioica*, Queen's Cottage grounds, Sept. 1919, *E. F. Turrill.*

HEMIPTERA.

*Aphididae.*

Subfamily APHIDINAE.

**Macrosiphum,** *Pass.*

**M. avellanae,** *Schr.* On *Corylus avellana.*

**M. chelidonii,** *Kalt.* On *Rubus idaeus.*

**M. (Neomyzus) circumflexum,** *Buckt.* On Chrysanthemums and Asters in one of the houses late in the year 1915.

**M. convolvuli,** *Kalt.* On *Convolvulus* sp.

**M. dirhodum,** *Walk.* On roses and grasses.

**M. granarium,** *Kby.* On grasses.
**M. millefolii,** *Fabr.* On *Achillea millefolium,* common.
**M. jaceae,** *Linn.* On *Centaurea nigra, Carduus* sp.
**M. lactucae,** *Schr.* On *Ribes.*
**M. pelargonii,** *Kalt.* On *Malva* sp. *Geranium robertianum.*
**M. pisi,** *Kalt.* On *Lathyrus, Lotus.*
**M. rosae,** *Linn.* On roses, always to be found.
**M. rosae,** var. **glauca,** *Buckt.* Usually to be found along with the previous species.
**M.** (**Amphorophora**) **rubi,** *Kalt.* On *Rubus spp.* but scarce.
**M. rubiellum,** *Theo.* This was the common Aphid on *Rubus spp.* in 1915.
**M. solanifolii,** *Ashm.* This was found in numbers on potatoes being grown in the Gardens in 1919. It has a wide range of host plants and will probably be found on other plants when looked for.
**M. sonchi,** *Linn.* On *Achillea millefolium, Centaurea, Chrysanthemum.*
**M.** (**Macrosiphoniella**) **sanborni,** *Gill.* Found in one of the houses in 1915. It evidently does not survive out of doors in this country.
**M. urticae,** *Linn.* On *Urtica dioica.*
**Drepanosiphum,** *Koch.*
**D. platanoides,** *Schr.* On *Acer spp.* common throughout the summer.
**Rhopalosiphum,** *Koch.*
**R. berberidis,** *Kalt.* On *Berberis spp.* very common in 1915 but not seen at all in 1919.
**R. persicae,** *Sulz.* Occurs on a very wide range of plants.
**R. ligustri,** *Kalt.* Apterous females found in 1919 on *Ligustrum sp.,* but evidently very rare.
**Melanoxantherium.**
**M. salicis,** *L.* On twig of *Salix Smithiana. H. St. J. Donisthorpe.*
**Siphocoryne,** *Pass.*
**S.** (**Brevicoryne**) **brassicae,** *Linn.* On *Brassica sp.* growing wild.
**S.** (**Cavariella**) **capreae,** *Fabr.* On willows, *Heracleum, Angelica, Aegopodium.*
**Phorodon,** *Pass.*
**P. humuli,** *Schr.* On *Prunus sp.*
**Myzus,** *Pass.*
**M. cerasi,** *Fabr.* On *Prunus cerasus,* forming black clusters and a glutinous mass.
**M. ribis,** *Linn.* On *Ribes* spp.
**M. tetrarhodus,** *Walk.* On roses, but, as far as our observations go, very rare.
**Aphis,** *Linn.*
**A.** (**Myzaphis**) **abietina,** *Walk.* On Spruce. *J. W. Munro.*
**A. chrysanthemi,** *Walk.* On Asters and Chrysanthemums out of doors.
**A. edentula,** *Buckt.* On *Crataegus monogyna,* rare.
**A. epilobii,** *Kalt.* On *Epilobium sp.,* rare.
**A. hederae,** *Kalt.* On Ivy and Holly, occasionally in numbers.

**A. lychnidis,** *Linn.* On *Lychnis sp.*, rare.

**A. pomi,** *De Geer.* On *Pyrus spp.*, common throughout the summer.

**A. pruni,** *Reaum.* On *Prunus sp.*

**A. pyri,** *Boyer.* On *Pyrus spp.*, rolling the margins of the leaves which turn red.

**A. rumicis,** *Linn.* On poppies, *Euonymus*, docks.

**A. saliceti,** *Kalt.* On willows, but scarce.

**A. sorbi,** *Kalt.* On *Pyrus spp.*

**A. viburni,** *Fabr.* On *Viburnum Opulus.* Several authors maintain that this species is the same as the one found on *Ribes* (*A. grossulariae*, Kalt.). If such were the case, under the conditions prevailing in the Gardens, one would expect to find *A. grossulariae*, but though careful search has been made repeatedly for it it has not been found.

Subfamily Callipterinae.

**Myzocallis alni,** *De Geer.* On Alders.

**M. castaneae,** *Buckt.* (**castanicola,** *Baker*). Swarming on *Quercus* sp. in 1915.

**M. coryli,** *Goeze.* On *Corylus*, common.

**M.** (**Tuberculatus**) **quercus,** *Kalt.* This appears to be the species regularly found on Oaks within the Gardens.

**Euceraphis betulae,** *Linn.* The common species on Birches.

**Callipterus betulicola,** *Kalt.* On Birch, occasionally.

**C. juglandis,** *Goeze.* On Walnut trees, very rare.

**Eucallipterus tiliae,** *Linn.* On Lime trees, rather common.

**Phyllaphis fagi,** *Linn.* On Beech trees, common throughout the summer, the copper variety appearing to be attacked more heavily than the ordinary one.

**Chromaphis juglandicola** (*Kalt.*). On Walnut trees, very rare.

Subfamily Chaitophorinae.

**Chaitophorus,** *Koch.*

**C. aceris,** *Linn.* Common on all species of *Acer.*

**C. populi,** *Linn.* Common on Poplars.

**C. salicivorus,** *Walk.* On *Salix sp.*

**C. tremulae,** *Koch.* This may be only a variety of *C. populi*, but it seems a well-marked species and is to be found on Aspens but not on Poplars growing in the immediate neighbourhood.

Subfamily Lachninae.

**Lachnus,** *Burm.*

**L. agilis,** *Kalt.* On *Pinus sylvestris*, rare.

**L. hyalinus,** *Koch.* On *Pinus sylvestris*, rare.

**L. pini,** *Linn.* On *Pinus sylvestris*, frequent.

**L. juniperi,** *Linn.* On *Juniperus virginiana* (Red Cedar), 8 apterous females, 28. viii. 1919.

Subfamily Schizoneurinae.

**Anoecia corni,** *Hartig.* Winged females of this species may always be found on *Forsythia*, but the true host-plants are the numerous species of *Cornus* growing within the Gardens.

**Eriosoma lanigerum,** *Hausm.* On *Pyrus sp.*, but fortunately by no means common.

**E. ulmi,** *Linn.* On Elm, rolling the leaves, abundant.

Subfamily Pemphiginae.

**Pemphigus (Thecabius) affinis,** *Kalt.* At the roots of *Ranunculus sp.*, very rare. Trail has recorded this species from Poplar.

**P. bursarius,** *Linn.* On Poplar, very rare.

**P. marsupialis,** *Koch.* On Poplar (Trail, Wild Fauna of Kew, 1906.)

**Tetraneura ulmi,** *Linn.* On Elm, very rare.

Subfamily Vacuninae.

**Vacuna dryophila,** *Schr.* Not uncommon on Oaks.

Subfamily Hormaphidinae.

**Cerataphis lataniae,** *Boisd.* On a palm in the Palm House.

Subfamily Phylloxerinae.

**Phylloxera quercus,** *Boyer.* In 1915 an oak was very severely attacked by this species, the leaves becoming first yellow and then shrivelling.

Subfamily Chermesinae.

**Chermes abietis,** *Linn.* On Spruce, forming characteristic galls.

**C. (Cnaphalodes) strobilobius,** *Kalt.* On Larch twigs.

Root-Feeders.

**Rhizobius menthae,** *Pass.* On roots of *Mentha aquatica*, 1907 (Prof. R. Newstead). I have seen the original specimens but have not found the species again.

Aleurodidae.

**Asterochiton phillyreae,** *Hal.* On *Phillyrea* and *Crataegus*. This species appears to be quite established within the Gardens.

**A. vaporariorum,** *Westw.* The adults of this species are usually to be found flying within the houses.

Psyllidae.

**Psylla buxi,** *Linn.* An exceedingly common species on *Buxus* causing the leaves to form little clusters, inside which live the nymphs.

**P. Försteri,** *Flor.* On *Alnus*.

**P. mali,** *Schmid.* On various species of *Pyrus* and *Crataegus*, only too common.

**P. pineti,** *Flor.* On conifers in the Pinetum.

**Psyllopsis fraxini,** *Linn.* On Ash, but apparently not common.

**P. fraxinicola,** *Forst.* On Ash, common.

Coccidae.

**Diaspis zamiae,** *Morgan*, on Cycads in the Palm House, December, 1919, *E. E. Green.*

### Nematoda.

*Mermithidae.*

**Mermis nigrescens,** *Dujardin.* This long, thread-like worm has been appearing in many parts of the country during the recent spell of thundery weather, and was found in the gardens on June 16. A parasite of insects, it is frequently found upon the leaves of plants, not, however, necessarily having recently emerged from its host, but from the ground out of which it appears during periods of excessive moisture for the purpose of oviposition. According to Hagmeier,* two years may be passed in the soil by the female before its eggs are ripe for laying. When laid they contain a large, coiled-up embryo. It is not known how this, on becoming a young worm, enters the body of its host. The eggs are probably eaten, in the case of a caterpillar, with its food, hatch in the gut, and then burrow through its wall into the body-cavity.

The egg itself of *M. nigrescens* consists of two shells: an inner one, thick and brown in colour, containing the embryo, and an outer one—thin, colourless, and transparent—bearing at each pole a filamentous process frayed out at the end into a bunch of minute rootlets, by means of which it adheres firmly to the surface of a leaf.

It is the brown colour of the inner shell of the egg which is seen through the body-wall of the female worm, and which in quantity appears as a line down the axis of the animal. After oviposition the worm becomes white. The adult attains a length of 60–150 mm. or more. There is doubtless much confusion between this species and *M. albicans*, von Siebold.

H. A. Baylis.

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## FLORA.

### Phanerogams.

**Myrrhis odorata,** *Scop.* In quantity and spreading near the Herbarium, May, 1920, *W. B. Turrill.*

**Taraxacum obliquum,** *Dahlst.* Near the Herbarium, April, 1913. *W. B. Turrill.*

**Cynodon Dactylon,** *Pers.* Abundant in the turf to the west of the new Range, *Sir W. Thiselton-Dyer.*

### Hepaticae.

**Riccia fluitans,** *L.* In the pond in the Berberis Dell, *F. Escombe,* Oct. 24, 1917.

### Fungi.

**Lepiota nauseosa,** *Wakef.* Nepenthes House, Feb. 1918. (See *Kew Bull.* 1918, p. 230.)

**Merulius pinastri,** *Burt.* Tropical Pits, September, 1917. (*Ibid.*)

**Boydia remuliformis,** *A. L. Sm.* Abundant on dead twigs of *Ilex Aquifolium,* Arboretum, Sept. 1919.

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* Zool. Jahrb., Syst., xxxii. (1912) p. 521.

**Aleuria tectoria** (*Cooke*) *Boud.* On the floor beneath a leaking hot-water pipe, Herbarium, Mar. 1920.

**Mastigosporium album,** var. **muticum,** *Sacc.* On leaves of *Dactylis glomerata,* L., 1918 (*Kew Bull.* 1918, p. 233).

**Mastigosporium album,** var. **muticum,** *Sacc.* On leaves of *destina,* Stapf, Tropical Pits, July, 1917. (*Ibid.* p. 233.)

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## XXXI.—FLOWERING OF PHYLLOSTACHYS AUREA.

J. S. Gamble.

This pretty bamboo *Phyllostachys aurea,* A. & C. Rivière, has recently flowered in this country and good specimens of the flowers have been received from Mr. Charles H. Cave. They came from gardens at Sidbury Manor, Sidmouth, Devonshire, and Rodway Hill House, Mangotsfield, Gloucestershire. It had previously, according to Mr. Bean, in "Trees and Shrubs hardy in the British Isles," vol. 2, p. 150, flowered in the garden of the late Canon Ellacombe at Bitton, and with the late Signor Fenzi at Florence in 1876. It also flowered with Mr. S. T. Heard at Rossdohan, Tahilla, Kerry, Ireland, about 1905. No description of the flowers seems, however, to have ever been published, so that it may be well to put on record the following:—

A caespitose shrub bearing erect stiff closely growing culms which may reach 10 to 15 ft. in height and are at first green, afterwards bright yellow in colour, smooth and shining, from ½–1 in. in diameter at base, where the internodes are short, while further up they reach about 6 in. in length, flattened on one side with sometimes a central ridge. The nodes are conspicuous and have a bluish coloured ring below them when young and when old a raised belt about ⅖ in. broad. Cataphylls straw-coloured with occasional brown spots, reaching 10 in. in length and glabrous, oblong below, narrowed gradually at the top and produced slightly to meet the ligule about $\frac{1}{10}$ in. long, below which the linear-subulate recurved blade varying from 1 to 4 in. long is inserted. Leaves with glabrous straw-coloured sheaths ending in short auricles with few stiff easily deciduous bristles; blade oblong-lanceolate from a short petiole, the tip long-acuminate and hair-pointed, 3–4 in. long, $\frac{1}{2}$–$\frac{7}{10}$ in. broad, glabrous on both surfaces except for white pubescence along the midrib near the base beneath, the upper edge scabrid, main nerves 5–6 on either side of the midrib, the transverse nervules closely tessellated. Panicle of flowers large, occupying nearly all the joints of the flowering culm and bearing a few leaves only but many deciduous spathaceous straw-coloured sheaths at the bases of the branchlets, the sheaths being about ¾ in. long with an ovate acuminate blade about half as long. Spikelets 2-flowered, ¾–1 in. long, glume usually one, lanceolate, acuminate, papery, with a short blade, glabrous except the ciliate edges; valve 1, tightly rolled, linear-lanceolate, glabrous, about 7–9-nerved; palea as long as the valve, bidentate, keeled, glabrous except the tips, which are minutely scabrous; stamens with very long exsert filaments; lodicules 1 to 2 when present, which is not always, $\frac{1}{10}$ in. long, oblong,

acute, hyaline, ciliate on the margins, 3–5-nerved; ovary stipitate, depressed, the style very long and slender with three minutely

1, part of stem; 2, sheath; 3, leaves; 4, base of leaf; 5, inflorescence; 6, flowers with anthers; 7, Flowers showing the styles.

feathery stigmas. A. & C. Rivière, "Les Bambous" (1878) 262, figs. 36, 37; Mitf. "Bamboo Garden" (1896) 114; Camus, "Les Bambusées" (1913) 64, pl. 33. 13.

## XXXII.—MISCELLANEOUS NOTES.

**Mr. W. Nowell,** Mycologist on the staff of the Imperial Department of Agriculture in the West Indies (see *K.B.*, 1913, p. 359), has been appointed Assistant Director of Agriculture, Trinidad.

**Mr. W. Harris,** Superintendent of Public Gardens and Plantations, Jamaica (see *K.B.*, 1896, p. 217), has been appointed Assistant Director of Agriculture and Government Botanist in that Colony.

**Mr. T. G. Mason.**—The Secretary of State for the Colonies has appointed Mr. T. G. Mason, B.A., Dip. Agric. T.C.D., on the recommendation of Kew, Economic Botanist in the Imperial Department of Agriculture, West Indies.

**Mr. F. G. Harcourt,** Sub-foreman on the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Agricultural Superintendent, Antigua, Leeward Islands.

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**Mr. H. W. Jack,** Agricultural Instructor, Agricultural Department, Federated Malay States (*K.B.*, 1914, p. 137), has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Economic Botanist in the Department.

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**Mr. J. N. Milsum,** Superintendent of Government Plantations, Agricultural Department, Federated Malay States (*K.B.*, 1913, p. 314), has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Assistant Agriculturist in the Department.

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**Capt. J. McDonald.**—The Secretary of State for the Colonies, on the recommendation of Kew, has appointed Capt. J. McDonald, B.Sc., of Bristol University, Assistant Mycologist in the Agricultural Department, British East Africa.

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**Major R. T. Wickham.**—The Secretary of State for the Colonies, on the recommendation of Kew, has appointed Major R. T. Wickham, late pilot officer, Royal Air Force, District Agricultural Officer in the Department of Agriculture, Uganda.

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Augustin de Candolle.—The premature and unexpected death of Richard Emile Augustin de Candolle, which took place at the family residence at Vallon, Geneva, on 4th May, 1920, removes the representative of the fourth generation of a name which will always remain illustrious in the annals of botanical science, and deprives Kew of a warm and sympathetic friend. The regret which this loss induces is accentuated by the circumstance that it has followed so closely the death of his distinguished father, recorded so recently in these pages (*K.B.* 1919, p. 237).

Born at Walton-on-Thames on 8th December, 1868, Augustin de Candolle was the younger son of the late Anne Casimir de Candolle, of Geneva. His mother was the daughter of the late Dr. William Marcet, F.R.S., of London. After a sound preliminary education in Geneva, young de Candolle was sent to Rugby in 1883. Leaving his public school in 1887 he then proceeded to the University of Heidelberg, afterwards passing to the University of Leipzig as a student in the faculty of law, in which profession he was, after the example of his illustrious grandfather, Alphonse de Candolle, very thoroughly trained. On returning to Geneva he did not take up the formal practice of his profession, but devoted himself, under the direction of his father, to morphological and systematic botanical study, to which he felt impelled alike by natural predilection and a sense of family duty.

Among his more notable contributions to botanical literature

may be mentioned one on the flora of Madagascar based on the collections of Mr. A. Mocquerys, and his descriptions of various previously undifferentiated species, especially from south-eastern Asia. The published results of his biological studies on monospermous capsules are also of much interest and reveal a capacity for sustained research which enables us to realise how much botanical science has lost by his death at the age of 51. But one advantage of his wide and varied education was that his scientific interests were not confined to botany alone. He took a very active part in the business of the Société helvetique des Sciences naturelles, as well as in that of the Société botanique de Genève and the Société botanique suisse. In the case of the Société de physique et d'histoire naturelle, of which he was President in 1914, he served for many years, and greatly to its benefit, as Treasurer of the Association.

After 1911 the scientific pursuits of Augustin de Candolle were greatly impeded by new and important duties of another character. His urbanity of manner and strength of character, his English education and his sound legal training rendered him an ideal incumbent of the post of British Consul for the Canton of Geneva, to which he was appointed on 1st January, 1912. The eight years during which he fulfilled its duties included the whole of the trying period of the great war, and provided him with occupation of a character so absorbing as to leave little opportunity for sustained scientific work. His memory will live in the minds of members of the English community at Geneva and of British travellers whose business necessitated recourse to the advice and assistance of their Consul during the anxious period 1914–18.

The death of his father on 3rd October, 1918, entailing as it did the assumption of his hereditary duties as custodian of the magnificent herbarium and library founded by his greatgrandfather, Auguste Pyrame de Candolle, rendered it incumbent upon Augustin de Candolle to demit his consular duties. The termination of the war enabled him to do this without feeling that he was abandoning his post, and his many friends, conscious of his great natural gifts and aware of the promise afforded by his earlier but all too scanty contributions to science, looked forward with justifiable hope to a long and distinguished custodianship, on his part, of the Candollean treasures. This was not to be, and botany is now the poorer for the loss of one of the most kindly and courteous and most widely informed of her votaries.

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Henry Powell.—We record with deep regret the death of Mr. Henry Powell at Mazeras, British East Africa, of heart failure, after a severe attack of malaria, on June 5th.

Mr. Powell had only recently resigned the post of Chief of the Economic Plants Division in the Agricultural Department of the East African Protectorate, and was about to sail for home after his many years of Colonial service. Mr. Powell came to Kew as a young gardener in 1888, and in May, 1890, was appointed Curator of the Botanic Gardens in the Island of St. Vincent. This

post he held until November, 1903, when he was appointed Assistant to the Director of Agriculture, British East Africa (*K.B.*, 1903, p. 31). He was promoted to the post of Chief of the Economic Plants Division in April, 1907. Mr. Powell sent numerous dried plants from St. Vincent to the Herbarium, and during his long service in British East Africa he contributed several collections to the establishment, including a new species of *Boscia* (*B. Powellii*, Sprague & M. L. Green), which was described in the *Kew Bulletin*, 1913, 178. The Library is indebted to him for a set of 4 volumes of *The East Africa Quarterly*, 1904–07.

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**The Old Linnean Garden at Upsala.**—The new Swedish Linnean Society, as a most important aim for its efforts, has decided to restore Linnaeus' botanical garden. This little place, the pride of Linnaeus and famous at his time, was abandoned on the establishment of the new garden more than a hundred years ago, and was allowed to fall into decay. The conservatories were later used as an archæological museum and Linnaeus' house was occupied by the Director of Music at the University.

The garden is now being restored to the original plan, and will be planted only with species grown there by Linnaeus himself. The work has been completed in its general outline, and the garden was opened to the public last May. Linnaeus' house, where he died, will be converted into a museum as a memorial of him which will be supplementary to his country house at Hammarby, familiar to several British botanists. Fortunately his personal belongings have remained in the hands of his few descendants, and it has been possible for the Society to acquire a rich collection, including furniture, porcelain, clothes, etc., so that it is hoped that the old house, which has been left practically untouched, will give a good idea of the surroundings in which he lived and worked. Upsala will no longer be in want of a memorial worthy of its greatest son.

The necessary funds are being collected among members of the Society. Dr. R. Sernander and Dr. O. Juel, Professors of Botany, have taken great pains to find out all the details of the old garden and of its contents. The place is now in charge of Professor N. Svedelius.

The General Secretary of the Linnean Society of London has undertaken to forward to Sweden any contributions towards the restoration of the garden that may be made by British botanists.

C. Skottsberg.

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**Amphichromy in heather.**—An interesting plant of *Calluna vulgaris* showing purple- and white-flowered inflorescences on the same stock was received last year from Mr. Dyson Perrins, Ardross Castle, by Alness, N.B., who found it on a grouse "moor" in the neighbourhood. In the same plant some of the inflorescences have flowers of the normal purple (or more correctly pale magenta)

colour, while the remainder have flowers with white sepals, white or very pale rose petals and red to purple styles and stigmas.

While colour variations in different individuals (purple, magenta, violet, dingy white, pure white) are not uncommon in *Calluna*, the occurrence of two distinct colours in the same stock is rare, and recalls to mind some of the well-known graft-hybrids (e.g., *Cytisus Adami*). A similar case has, however, been described by Lindman (Bot. Not. 1907, p. 201) in a plant collected some miles north of Stockholm, Sweden. The author believed his plant to have arisen by cross-fertilization of a white and a purple heather. If he is correct we have here perhaps a case somewhat similar to that of *Medicago media*, the sand lucerne or variegated alfalfa, a hybrid between the purple- (*M. sativa*) and yellow-flowered (*M. falcata*) lucernes. In this plant many colour variations occur even on one and the same plant, white-yellow, dingy yellow, yellow with violet veins, lilac, and green to green-violet flowers being met with. Experiments with this plant and their results are dealt with by Urban in Brand. Verhandl. xix. pp. 125 seq., 1877. Other interesting examples of the influence of hybridization on colour are to be found in Kerner and Oliver, "The Natural History of Plants," vol. ii. pp. 566 seq., and the more modern work on flower colours with special reference to genetics is dealt with in M. Wheldale, "The Anthocyanin Pigments of Plants," 1916.

Lindman (l.c.) proposes the following terminology for flower coloration:

1. Polychromy, indicating many colours or variegated coloration in the same corolla. Thus *Linaria alpina* has two colours (violet and orange) and *Convolvulus tricolor* three colours (violet-blue, yellow and white) in the same corolla. The two-coloured inflorescences of many Compositae (e.g. *Aster*, *Leucanthemum*) and some Umbelliferae (e.g. *Daucus setulosus* as described in *Kew Bulletin*, 1918, p. 293) would be included here, though Jackson in his "Glossary of Botanical Terms," uses heterochromous in this connection. The polychromy of a hybrid is often due to the mixing of the parental colours (e.g. *Dianthus*, *Iris*).

2. Heterochromy, indicating colour differences between the individuals of one species. This is known, for example, in *Hepatica triloba*, *Melampyrum cristatum*, *Anthyllis vulneraria*, *Calluna vulgaris* (see above) and many other species. Sexual heterochromy between male and female plants of a dioecious species is not infrequent. Jackson (l.c.) defines "heterochromatism" as "a change in the colouring or marking of petals."

3. Amphichromy, indicating difference in the colouring of the flower on the same stock, this is most often due to crossing or some other accidental influence. It is habitual in *Cytisus Adami* and *Medicago media*, but individual and local in *Polygala amarella*, *Viola canina*, *Azalea indica*, and *Calluna vulgaris*. Miss Gibbs (Journ. Linn. Soc. Bot. xxxix. p. 146) describes red and yellow flowers of *Metrosideros villosa* as sometimes occurring on the same tree in Fiji. Monoecious plants are often sexually amphichromatic, with more conspicuous colours in the male.

4. Metachromy, indicating the changing or losing of colour in one and the same flower, generally with age. Examples are several *Borraginaceae*, *Ribes aurem* and certain forms of *Viola tricolor*.

Two or more of the above categories may be represented in one and the same plant. Thus *Medicago media* shows amphichromy, heterochromy, and metachromy; *Viola tricolor* f. *versicolor* is polychromatic, metachromatic, heterochromatic, and perhaps even sometimes amphichromatic. Certain plants are known to vary in regard to floral coloration with the season, producing flowers of one colour in one season, of another colour in another season. This change of floral colour in one and the same or in separated stocks can be termed seasonal amphichromy or seasonal heterochromy. W. B. T.

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**Cardamine pratensis β uniflora in Britain.**—An interesting and at first sight striking form or variety of the common lady's smock was received in April this year at Kew. It was found by Miss M. E. Francis "in damp ground in a copse, where quantities of lady's smock grows," near Rudgewick, Sussex. The plant has well-developed radical leaves and shows no sign of starvation, but all the peduncles are about 9 cm. high, one-flowered and quite destitute of cauline leaves or bracts. In the specimen received 5 of them arise from the rosette of basal leaves.

This plant is evidently similar to that described as *Cardamine pratensis β uniflora* by Sternberg and Hoppe in Denkschr. Bot. Gesell. Regensburg, 1815, p. 157, where the following description is given: "acaulis, aphylla, uniflora, foliis radicalibus petiolatis, pinnatis impari majore transverse ovato, dentato." The authors state that they found it in abundance in a damp meadow near a colliery in Bohemia. Some plants transplanted into pots and wintered in a glasshouse spread during the winter and, according to these authors, in the following spring changed back to ordinary *C. pratensis!*

In the Watson Herbarium at Kew there is a specimen of *C. pratensis β uniflora* from the Braemar mountains, Aberdeenshire, collected by H. C. Watson in 1844. No reference has, however, been found in recent floristic literature to this plant, which may be looked upon as an unstable mutation or sport. W. B. T.

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**Botanical Exploration in Chile and Argentina.**—The following travellers and publications should have been referred to in the paper on this subject published in the *Kew Bull.* No. 2, 1920, pp. 57–66: **John Ball,** in Journ. Linn. Soc. Bot. xxi. p. 203, 1884, published "Contributions to the Flora of North Patagonia and the adjoining Territory," which consists of an account of plants collected by **G. Claraz,** a Swiss gentleman, in Argentine territory. In the same author's paper in the Journ. Linn. Soc. Bot. xxii. 1886, p. 137, entitled "Notes on the Botany of Western South America," pp. 158–168 he deals with plants from localities in Chile. Again in the Journ. Linn. Soc. Bot. xxvii. 1891, p. 471, Ball, under

the title "Further Contributions to the Flora of Patagonia," dealt with a collection made by **W. Andrews** in Patagonia and presented by him to Kew. The writer is indebted to Prof. Hans Schinz of Zurich for calling his attention to these papers by Ball.

**F. Meigen,** in Engler's Bot. Jahrb. xvii. 1893, p. 199, has a paper, "Skizze der Vegetationsverhältnisse von Santiago in Chile," which contains a general account of the flora between Aconcagua and Maipu and a list of all the plants known from this area.

**Frömbling,** in Bot. Centrl. xvi. Jah. Bd. 62, 1895, pp. 4, 40, published a general account of botanical excursions conducted during three years' stay in Chile.

**F. W. Neger,** in Engler's Bot. Jahrb. xxiii. 1896, p. 382, has an account of the vegetation in S. Chile under the title "Die Vegetationsverhältnisse im nordlichen Araucanien (Flusegebiet des Rio Biobio)." The same botanist, in Engler's Bot. Jahrb. xxviii. 1899–1901, p. 231, has a paper "Pflanzengeographisches aus den südlichen Anden und Patagonien," which records the observations made and the plants collected in the summer of 1896–1897 in the Cordillera de Villarica.

**Expedition Antarctique Belge.**—Resultats du Voyage du S.Y. *Belgica* en 1897–1899. Botanique (Les Phanerogames des Terres Magellaniques) par **E. de Wildeman,** 1905. This work consists of (1) a systematic enumeration of the Phanerogams collected by **M. E. Racovitza** during the voyage of the S.Y. *Belgica* towards the S. Pole, (2) a systematic enumeration of the Austro-Antarctic American Phanerogames, and (3) statistical tables of the same. The reports of the **Princeton University Expeditions to Patagonia, 1896–1899,** vol. viii. Botany, is at present composed of three bulky volumes, most of which are occupied by G. Macloskie's "Flora Patagonica." A useful bibliography is given in the second volume. W. B. T.

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**The Flora of Jamaica.**—The 4th volume, the 3rd to be published, of the "Flora of Jamaica," by W. Fawcett and A. B. Rendle, has now appeared, and consists of 369 pages of printed text and incorporated figures. The arrangement followed is that of Engler's Pflanzenfamilien, and the orders dealt with in the present part are the following: *Leguminosae, Geraniaceae, Oxalidaceae, Linaceae, Erythroxylaceae, Zygophyllaceae, Rutaceae, Simarubaceae, Burseraceae, Meliaceae, Malpighiaceae, Polygalaceae, Euphorbiaceae* and *Callitrichaceae.* Of these, the *Leguminosae* occupy 153 pages and the *Euphorbiaceae* 100 pages. Each genus is illustrated by a text figure and dissections. The keys and descriptions are in English and full references to bibliography and synonyms are provided. An index to the single volume is provided at the end. W. B. T.

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